THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 39 AUGUST, 1936 No. 5

INDEX TO CONTENTS

Synthetic Resins from Natural Rubber 269
By Herman Alexander Bruson

Coal Tar Carbon Black 271

Economics of Russia's Synthetic Rubber 272
By O. Osipov-Schmidt

Aluminum and Rubber 273
By R. T. Griebling

Rubber at the Great Lakes Exposition 276

Rubber Used in Handling 200-Inch Lens 277

Chlorinated Rubber in Paints 278

Testing Rubber Footwear 279
By W. E. Glancy

Z-M-L—A New Accelerator 281

Effect of Light on Goldenrod 282

Rubber Outings of Yesteryear 282

New Equipment 284

REGULAR DEPARTMENTS

Late Domestic News	287	**Editorials**	286
Financial News	292	**Chemical Markets**	299
Book Reviews	285	**Statistics**	300
New England News	294	**Market Place**	304
Names in the News	291	**Advertising Index**	308
Rubber, Cotton Markets ...	298	**Classified Ads**	308

THE RUBBER AGE, published on the 15th of each month by the Palmerton Publishing Company, Inc., at East Stroudsburg, Pa. Editorial and Advertising offices at 250 West 57th Street, New York City. Established 1917.

Entered as Second Class Matter, October 20, 1933, at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879.

Subscription Rates: Domestic, $2.00 a year; Canada, $3.00; Foreign, $3.00. Single copies, up to 3 months old, 25 cents; over 3 months old, 50 cents.

Telephone: COlumbus 5-2923, 5-2924.

Contents Copyrighted 1936 by the Palmerton Publishing Company, Inc. Indexed in Industrial Arts Index.

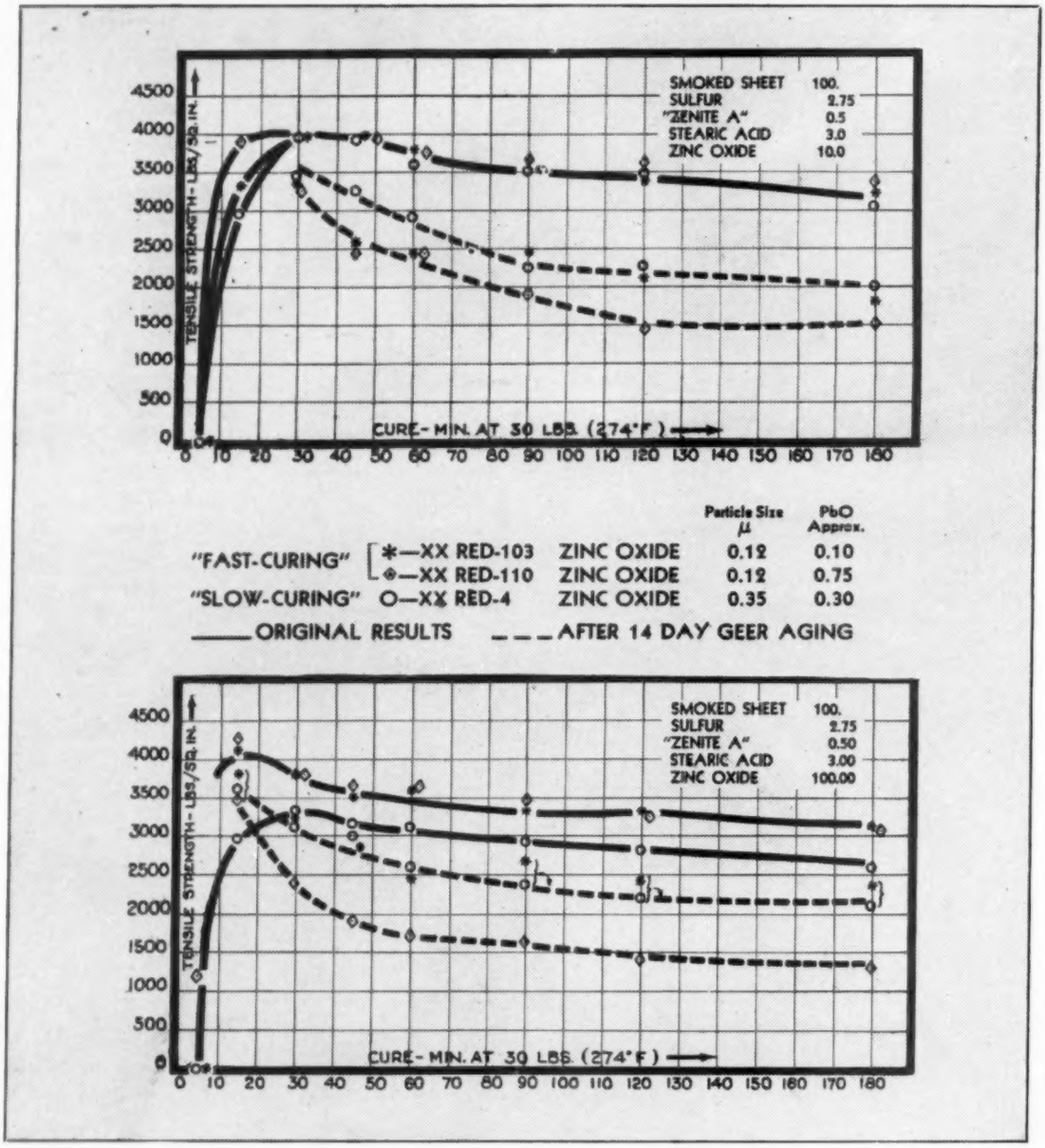
PAUL L. PALMERTON.....President
E. D. OSBORN.....Vice-President and Sec'y
PETER P. PINTO.....Treasurer

M. E. LERNER.....Managing Editor
A. H. GOLD.....Circulation Manager
PETER P. PINTO.....General Manager

"Fast-" and "Slow-Curing" Zinc Oxides with "ZENITE A"

No. 50

of a series of charts showing a comparison of "FAST-" and "SLOW-CURING" zinc oxides with typical accelerators.



With 10 parts of zinc oxide, **XX Red-110** is somewhat more active than **XX Red-103** and **XX Red-4.** This is due to the relatively high free PbO content of **XX Red-110,** which in this compound also affects the aging properties adversely. • With 100 parts of zinc oxide these differences continue and **XX Red-4** exhibits the usual retardation. Comparable results may be obtained with the following brands: **XX Red-103** compares closely with **Kadox Black Label-15.** **XX Red-110** compares closely with **Kadox Red Label-17.**

UNIFORM QUALITY ZINC OXIDES

THE NEW JERSEY ZINC COMPANY

The Rubber Age

Published Monthly at East Stroudsburg, Pa.
Editorial and Advertising Offices: 250 W. 57th St., New York

Vol. 39 AUGUST, 1936 No. 5

Synthetic Resins From Natural Rubber

By Herman Alexander Bruson
of the Rohm and Haas Company, Inc.

EDITOR'S NOTE: The talks delivered at the technical conferences held from time to time at Gibson Island, Maryland, under the sponsorship of the Department of Chemistry of Johns Hopkins University, are informal in nature, and as frontier problems are discussed few papers based on these talks are ever published in the technical press. Because of the importance of his subject, we prevailed upon Mr. Bruson to prepare the following paper for publication in THE RUBBER AGE. It was presented by the author on July 21, 1936, at the Gibson Island Symposium on Synthetic Resins.

SINCE natural rubber is essentially an unsaturated hydrocarbon of high molecular weight, having the empirical composition $(C_5H_8)_x$, and is as reactive as the simple olefines toward chemicals which affect a double bond, it is not at all surprising that rubber should have been subjected to all the known reagents which are at the disposal of the chemist for effecting addition, substitution, or condensation reactions with unsaturated compounds in general.

The classical investigations of Harries, showing that the rubber hydrocarbon is built up of polymerized isoprene units, is helpful in visualizing the various changes which rubber undergoes upon chemical treatment Although there is considerable uncertainty as to whether the isopentene groups are arranged in chains or rings or combinations of both, it is generally accepted that each C_5H_8 group in the rubber molecule contains one double bond, and that the number of such C_5H_8 units is very large—possibly hundreds or even thousands per mole of rubber.

For simplicity sake, it will be assumed that the rubber hydrocarbon contains predominantly the following grouping:

$$= \overset{\overset{CH_3}{|}}{C}\text{-}CH_2\text{-}CH_2\text{-}CH = \overset{\overset{CH_3}{|}}{C}\text{—}CH_2\text{-}CH_2\text{-}CH =$$

The rubber industry depends primarily upon the reaction of rubber with sulfur to yield vulcanized rubber. Unquestionably, the reaction occurs at the double bond. Depending upon the amount of sulfur used, and the conditions of vulcanization, products varying in physical properties from soft, elastic, resilient materials to hard, dense, brittle masses, so-called hard rubber or Ebonite, are produced. The proper compounding of the components with other materials, such as metal oxides, fatty acids, softeners, fillers, reinforcing agents, age-resistors, accelerators, etc., to produce articles of utility, is the art of rubber manufacture.

Other chemicals which are capable of adding to double bonds may function as vulcanizing agents. These include selenium and tellurium, as well as their chlor-

ides, also sulfur chloride and sulfur thiocyanate. Another interesting group of vulcanizing agents are the organic peroxides and ozonides, such as benzoyl peroxide or rubber ozonide; furthermore, certain nitro compounds, such as di-nitro and trinitrobenzene, and certain quinones, such as chlorobenzoquinone.

The above vulcanized products are all amorphous or resinous bodies. With the exception of hard rubber, they are characterized by their softness and elasticity. Although swellable, they are, in general, insoluble or difficultly soluble in the ordinary solvents, and are relatively non-thermoplastic.

There exist, however, a number of transformation products of rubber that are hard, dense, resinous substances, which are, in many cases, not only soluble in common organic solvents and useful, therefore, as coating or varnishing materials, but are also often thermoplastic and capable of being molded, milled, extruded or pressed, to form objects having an appearance quite different from that ordinarily associated with vulcanized rubber. These rubber conversion products may be grouped into the following classes:

1. Addition products of rubber
2. Isomerization products of rubber
3. Condensation products of rubber

Halogenated Rubber

Due to its unsaturation, rubber readily takes up chlorine. Upon passing chlorine into a dilute chloroform solution of rubber, a light yellow or white crumbly material can be obtained having the composition $(C_{10}H_{14}Cl_8)_x$. At ice temperature, a material $(C_{10}H_{16}Cl_6)_x$ is formed. Both addition and substitution therefore occur, hydrogen chloride being evolved. It has recently been suggested by Kirchhof that the initial addition product $(C_{10}H_{16}Cl_4)_x$ which might at first be formed, loses hydrogen chloride to form an unsaturated bond which then takes up additional halogen. Such reactions are quite common with simple tertiary olefines, i.e., olefines containing an unsaturated carbon atom which carries no hydrogen atom. Chlorinated rubber is manufactured today with a chlorine content of about 60-65%, corresponding to between 6 and 7 chlorine atoms per $C_{10}H_{16}$.

Various methods for conducting the chlorination have been proposed. One method utilizes a solution of rubber in an appropriate solvent such as carbon tetrachloride, which is agitated and cooled while chlorine is passed in. Heat and catalysts, such as iodine or ultra-violet light, accelerate the rate of chlorination. Other solvents, such as benzene, can be used, since the formation of chlororubber takes place faster than the formation of chlorobenzene. In order to obtain chlororubber which will give solutions of low viscosity, adapted for painting or brushing, the rubber before chlorination is masticated or "broken down" on mill rolls, or treated with mild oxidizing agents such as air. By chlorinating at elevated temperatures or in the presence of alkalies to bind the hydrogen chloride formed, chlororubber having a greater stability and lower viscosity is obtained.

After chlorination is complete, the solvent is removed by running the solution into water and agitating the mixture while passing in steam. This leaves the chlororubber in the form of small whitish, fibrous shreds or crumbs which can readily be dried and handled, or ground to a fine powder. The addition of a small quantity of aromatic amine is said to prevent the development of hydrogen chloride on storage.

As commercially obtained, chlororubber is a white powder having a specific gravity of 1.5. It is stable to temperatures up to 150°C., at which temperature it begins to turn brown. The product is incombustible. When exposed to an open flame, it chars without burning. It is soluble in benzene and its homologues (toluene, xylene, solvent naphtha), esters, (ethyl acetate, butyl acetate, dibutyl phthalate, tricresyl phosphate), chlorinated hydrocarbons, tetralin, and drying oils. It is insoluble in water, alcohols, glycerine, gasoline or petroleum oils. In the form of coatings, the product is resistant to acids or alkalies, and gives tough, adherent films on wood or metal. It is usually pigmented and plasticized to obtain the most desirable coatings. In the unpigmented form, the films are transparent and slightly yellow. Chlorinated rubber can be molded at 125° C. and 1000 lbs./sq. in. pressure to give a transparent light yellow lustrous mass.

Rubber reacts with bromine to form a tetrabromide $(C_{10}H_{16}Br_4)_x$ which readily splits off hydrogen bromide. Rubber bromide condenses with sodium phenate to form a rubber phenol which is soluble in alkali and capable of coupling with diazotized aromatic amines. These resinous materials are at present of no commercial significance. Iodine adds to rubber to form an unstable compound $(C_{20}H_{32}I_6)_x$.

At the present time, the most important resinous derivatives of rubber which are manufactured commercially, as listed by the author, are as follows:

Product	*Trade Name*
Chlorinated Rubber	"Tornesit"
Rubber Hydrochloride	"Marsene" "Pliofilm"
Isomerized Rubber	"Thermoprene"
Modified Isomerized Rubber	"Plioform" "Plialite"

Rubber Hydrohalide

Hydrogen chloride adds to the double bond of the rubber hydrocarbon to form $(C_5H_9Cl)_x$. On passing hydrogen chloride into a chloroform solution of rubber, the viscosity rapidly falls, the color darkens, and a thin solution of rubber hydrochloride is formed. When precipitated with alcohol, it forms a white fibrous mass. The product is soluble in aromatic hydrocarbons and chlorinated hydrocarbons. It readily loses HCl when heated. It can be almost entirely dehalogenated by heating with metallic zinc or with pyridine. Rubber hydrochlorinated to the extent of 80-90% is useful as a film-forming material. The film is transparent, light in color, very flexible, tough and elastic, and resembles Cellophane.

By using liquid anhydrous hydrogen chloride both as a solvent and as a hydrochlorinating agent for rubber, Gebauer-Fuelnegg and his associates were able to obtain almost instantaneous reaction between the rubber and hydrogen chloride at low temperatures. The excess hydrogen chloride was then evaporated off, leaving a new form of rubber hydrochloride having improved properties as regards stability and color.

The hydrobromide, or hydro-iodide of rubber, are of no commercial significance, due to their high cost and instability.

Rubber reacts with dry hydrogen fluoride in ben-

zene solution to form an isomerization product which, when precipitated with alcohol, is a white, thermoplastic solid, capable of being molded under heat and pressure to form transparent objects. Apparently, very little, if any, addition of hydrogen fluoride to the double bonds occurs.

The isomerization products of rubber above referred to are an interesting class of thermoplastic resinous materials which are becoming of increasing importance.

As stated before, the removal of hydrogen chloride from rubber by means of zinc powder or pyridine, yields a white powder containing only a trace of chlorine. Harries referred to this material as "alphaisorubber."

By reacting upon a benzene solution of rubber with concentrated sulfuric acid, a crumbly inelastic product is formed which represents a conversion product of rubber having the empirical formula $(C_5H_8)_x$. These materials were thoroughly investigated by F. Fisher and his associates in this country, and the products found to be useful as molding materials, adhesives, and coating compositions. It was found that by milling concentrated sulfuric acid into rubber and heating the mixture to about 130°C., an exothermal reaction occurred. The rubber became hard and dense and lost its characteristic softness and elasticity. The dark tough products obtained could be rendered soluble in organic solvents such as hydrocarbons, and used as adhesives for bonding vulcanized rubber to steel.

By using varying proportions of sulfuric acid or other compounds of the general type, $R\text{-}SO_2X$, where R represents an organic radical or hydroxy group and X represents chlorine or a hydroxy group, compounds, varying from tough balata-like or leathery materials to hard, brittle, shellac-like substances could be obtained. When carefully purified, these conversion products were found to be isomeric with the rubber hydrocarbon. Among the useful reagents suggested for this purpose are aromatic sulfonic acids or sulfonylchlorides, such as p-toluene sulfonic acid, phenol sulfonic acid, and p-toluene sulfonyl chloride.

The tough, non-friable heat-plastic rubber conversion products obtained by the above processes were found to have a density of 0.97 to 1.00, a tensile strength at 22°C. of 1000 to 5000 pounds per square inch, and a softening temperature of 55 to 105°C. They melt with decomposition at temperatures from about 160-250°C. to form thick, brittle, resinous materials.

The halides of amphoteric metals, such as ferric chloride, stannic chloride, aluminum chloride, and antimony pentachloride, likewise isomerize rubber to thermoplastic, tough or brittle products, when heated with solid rubber. In benzene solution, rubber reacts readily at ordinary temperature with stannic chloride, titanium tetrachloride, or antimony pentachloride, to form colored addition compounds. These compounds can be isolated by carefully removing the solvent and excess of the metal chloride in high vacuum. Analyses of products carefully made from purified rubber, indicated that rubber hydrocarbon combined with these metal halides in the following ratios, respectively: $(C_5H_8)_{10}.SnCl_4$; $(C_5H_8)_{10}TiCl_4$; $(C_5H_8)_5.SbCl_5$. Upon treatment with alcohol, acetone, or water, the metal halide is split off and the $(C_5H_8)_x$ isomer of rubber is precipitated as a white powder. These isomers are readily soluble in hydrocarbons to give thin solutions. They are moldable to give pale transparent objects. Similar isomers are obtained from rubber and boron fluoride or fluoboric acid.

Commercial products which are modified isomers, are manufactured from rubber and chlorostannic acid, H_2SnCl_6. These products are chloro derivatives of isomerized rubber. They have many valuable properties in the coating and molding fields, primarily because of their pale color, inertness, and insulating properties.

When heated at 250°C., in ether solution, rubber forms a series of unsaturated cyclization products which are whitish powders, and physically resemble the isomers from rubber obtained by the action of sulfuric acid or of metal halides.

By heating rubber at 250-260°C. with diatomaceous earths or porous surface-active substances, such as bleaching clays having a slightly acid reaction, similar conversion products are obtained which, upon hydrogenation, yield very pale, almost colorless hydrocarbon-soluble resins.

An entirely different type of rubber conversion product is obtained by treating rubber with aliphatic per-carboxylic acids at low temperatures; for example, per-acetic acid. The products obtained are whitish, powdery or fibrous materials which are soluble or greatly swellable in the lower alcohols (methanol, ethanol) or in acetone. It is probable that they contain alcoholic hydroxyl groups which are partly acylated by the acids employed. In this respect they would resemble cellulose acetate. They can be molded or used as coating compositions.

There are finally a number of resinous condensation products of rubber which are of technical interest.

Rubber, for example, condenses with phenol in the presence of mineral acids or metal halides to form resinous alkyl (rubber) phenols. These products are alkali-soluble. It is probable that the aromatic nucleus adds to the tertiary unsaturated carbon atom just as in the case of isobutylene. Rubber also undergoes the so-called "Formolite" reaction, analogous to the simple olefines, upon treatment with formaldehyde and concentrated sulfuric acid. The product is a hard, resinous mass. This reaction can be modified by the presence of phenol to give a rubber derivative of the phenol-formaldehyde resin type.

The hydrogenation products of rubber may find application as resins. They are completely saturated and do not undergo oxidation. Depending upon the conditions of hydrogenation, oily to viscous transparent materials are obtained.

Coal Tar Carbon Black

THE development of a carbon black comparable to the American product has finally been achieved by Germany, according to a report from the American Consul at Frankfort-on-Main to the Bureau of Chemistry of the Department of Commerce. The German product, which is based upon naphthalene, a derivative of coal tar, is now in commercial production and is believed to be rapidly replacing American blacks previously supplied for practically all of the country's high grade black pigment.

Several months ago the German government placed an official restriction on exports of naphthalene, and it is now believed that this action was taken at the request of German manufacturers who wanted to be assured of an adequate supply of this raw material before entering production on the new carbon black. This black, incidentally, is considerably higher in cost, according to report, than that imported from the United States and other countries, a situation overlooked because of the difficulties surrounding foreign exchange.

Economics of Russia's Synthetic Rubber

By O. Osipov-Schmidt

Head of the Central Department of the Rubber Industry of the U.S.S.R.

Because of the recent attention given to the synthetic rubber produced by the U.S.S.R. (Sovprene) in the technical press, although little actual information as to the chemical and physical properties or the actual process used in producing this material has been made available, the following article describing the economics of Russian synthetic rubber, which is reproduced from the July, 1936, issue of the "Bank for Russian Trade Review," should prove of interest.—EDITOR.

THE industrialization of the Soviet Union would have been incomplete without the establishment of an independent rubber industry. Socialized industry and the defence of the country require imperatively a home source of rubber which fully supplies the demands of the U.S.S.R. This source of rubber has now been established and at present we can say with confidence that the U.S.S.R. has definitely set up its own rubber production industry.

Branch of Socialized Industry

The production of synthetic rubber, which was first conceived five years ago, is developing into a powerful branch of socialized industry. It controls a number of large plants and a chain of experimental stations. The U.S.S.R. is also building a number of enterprises which will secure for the country by 1937 the satisfaction of all its requirements in rubber from home sources.

It is well known that the consumption of rubber is regarded as one of the principal indicators of the technical development and defensive capacity of a country. It is therefore of interest to know that next year the U.S.S.R. will assume second place in the world after the United States as a consumer of rubber, a place at present held by Great Britain.

As a producer of rubber the U.S.S.R. in 1937 will assume third place after Great Britain and Holland, two countries which are practically monopolistic producers of world rubber at present. However, even at the present time the Soviet Union occupies first place in the world as far as effective utilization of capital investment in the rubber industry is concerned. If the assertions of economists are true that the capital investment in rubber plantations of the various States exceed 1,000 million dollars, while the annual output is 900,000 tons, on which one million workers are engaged, then we must assume that the Soviet capital investment will produce considerably higher results in 1937.

Labor productivity is nine times as great in the U.S.S.R. as in the capitalist rubber plantations, in spite of the unscrupulous exploitation that goes on in those plantations. The essential difference in labor productivity in the U.S.S.R. and in those countries is mainly explained by the superiority of the socialized economy and Soviet conditions of labor. Another factor is the advantage of factory production of rubber over plantation production, because in the factory complete mechanization of all the processes is possible, and a continuity of labor is achieved as well as a more economic utilization of raw materials.

The whole organization of work and the system of production of synthetic rubber is rationalized and organized so as to avoid loss.

As a result of all this the amount of labor expended for the production of one ton of rubber is considerably lower in the U.S.S.R. than in the case of plantation rubber. According to various calculations of specialists the cost of one ton of dry, packed rubber delivered to the port of Colombo varies between 864 and 1,440 working days. Taking into consideration all the labor expended in the production of one ton of synthetic rubber in the U.S.S.R. (i.e., growing of potatoes, production of alcohol, manufacture of synthetic rubber, and so on) it occupies 485 working days. If we take into account the utilization of various by-products then the number of working days is further reduced to 340 to 360. That is only a quarter of the cost of plantation rubber.

It must be stated, however, that the production costs of rubber in the U.S.S.R. are still high, but these can and should be reduced to a fraction of the present cost.

At the present time the by-products are not being fully utilized. The introduction of the Stakhanov movement should also assist in increasing production and reducing costs. The increased harvest of potatoes which is constantly proceeding is another factor which will bring down the costs. The previous calculations of the costs were based on the production of 12 to 15 tons of potatoes from one hectare of land, while the Liebknecht Collective farm in the Moscow area has already achieved a harvest of 50 tons of potatoes per hectare. With such a crop of potatoes it would be possible to obtain two tons of synthetic rubber from one hectare, and this would reduce the cost to one quarter of the present figure.

Need for the Synthetic Material

Natural rubber does not fully satisfy the principal requirement of modern technique, particularly as far as transport is concerned. After a three-hour run at 50 km. per hour the temperature of a tire reaches 100 to 140 degrees; driven for 48 hours at this speed the resistance of the tire made of natural rubber decreases to about one-third, while the tire made of synthetic rubber retains its resistance. This has been proved by repeated tests made by the Leningrad Works.

Dr. Weber, the head of the tire manufacturing department of the "Continental" factory, in Germany, in reply to complaints by users on the quality of tires stated that the quality of the tires manufactured by the firm is not inferior to that of two or three years ago,

(Continued on page 282)

Aluminum and Rubber

Both Products are Parallel from Many Angles Including Historical Background, Versatility, Etc., and are Being Used in Combination

By R. T. Griebling
Aluminum Company of America

ALUMINUM and rubber are strikingly parallel. Both, for instance, have small beginnings: In two days' time, only a few hundred pounds of aluminum can be made in a single electrolytic cell, and only a fluid ounce of latex can be taken from a rubber tree.

While both are versatile materials, the applications of aluminum and rubber to industry are definitely limited so long as they remain in the pure state. The versatility is achieved by the proper use of alloying ingredients in the case of aluminum, and of the chemicals which are compounded with rubber.

Further parallels may be noted: Aluminum and rubber find their greatest application in the transportation industry. Rubber goes into tires and tubes, into motor suspensions and shock absorbers. Aluminum is used for pistons and connecting rods, cylinder heads, bus and truck bodies, in the construction of railroad cars and streamlined trains.

Both the aluminum and the rubber industries are young. Plantation rubber dates back to 1900, when rubber trees first began to be cultivated extensively as the result of the farsightedness of Sir Henry Wickham. The present-day aluminum industry had its inception in 1886, when a discovery by Charles Martin Hall revolutionized the metal world. Aluminum had been known since 1825, but very little of it had been used. It was costly, once far above the price of gold or silver, and its applications were largely confined to jewelry and laboratory research. The supply of aluminum ore should have assured an inexpensive metal, for aluminum is the most plentiful metal in the earth's crust, being almost twice as common as iron and much more abundant than copper. Aluminum was costly only because the method of making it was costly.

Hall Process Still in Use

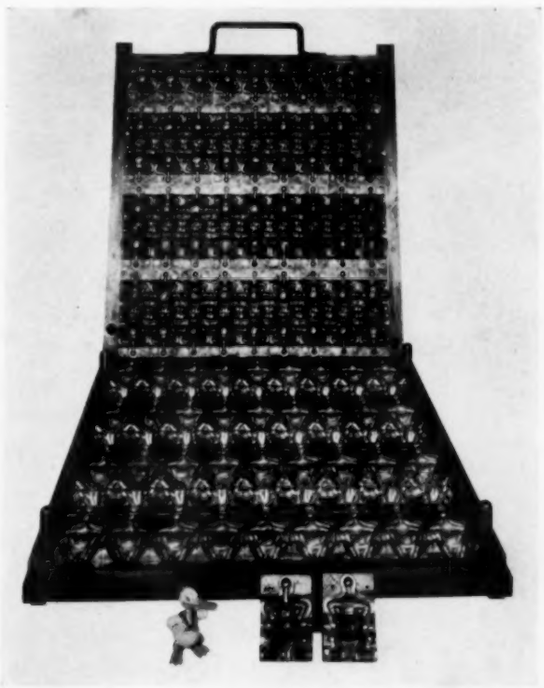
Hall invented a process for the inexpensive production of aluminum, which brought the price of the metal down to a point where it could compete with the everyday metals of commerce. (Today the price of aluminum, in ingot form, is approximately twenty cents a pound). The Hall process is still in use. It gave the world a metal which found its way into the manufacture of many commodities.

Rubber is employed in the fabrication of aluminum. It is used in punches for forming work, in soft gaskets for testing leak-proof castings, in expansion dies and pressure rings. The bushings of flexible couplings used in motor drives are of rubber, as are conveyor and elevator belts. Both hard and soft rubber is found in the rolls used in the foil mills, and in the transfer rolls of the foil printing presses.

Minor may be the use of rubber in the packing for aluminum tubing, which is protected from the scuffing and abrasion by rubber washers, yet it shows how versatile the application of rubber has become. It is used in the liners of aluminum Mason jar caps and other types of closures, over and above the more obvious uses of rubber in the form of hose, tires for trucks and dollies, insulation for switchboards, and shock adsorbers for laboratory instruments.

Just as rubber found its way into the aluminum industry, so aluminum may be found in the rubber industry. It has a number of qualities which make it of particular value in the manufacture of rubber. Aluminum is immune to attack by sulfur and some of its compounds, many of which are to be found in rubber factories. It is light in weight and easily handled, it does not cling to rubber during processing, and it conducts heat rapidly.

The strength of aluminum alloys has long been known. They can be made as strong as structural steel. There is hardly a metal which can be obtained



Aluminum molds, similar to this one of the Donald Duck novelty made by Ferriot Brothers, Akron, are used by many rubber factories.

in so many forms as aluminum. It is available in plate, sheet and foil; bar, rod and wire; in structural shapes and extruded molding; in tubing of various shapes; in sand, permanent mold, and die castings; in forgings, pressings, and stampings; in screw-machine products and rivets. It can be joined by all types of welding, by riveting and other types of mechanical joints, and can be fabricated easily into special and intricate forms of apparatus.

Aluminum Used in Making Hose

The use of aluminum in the rubber industry is not new, but year after year new applications are developed which present an ever-changing picture. A new use of aluminum is in the building of oil suction hose. Sections of rubber hose, whose inside diameter may be as large as 8 in., are made in 50-ft. lengths. Each end is equipped with a cast aluminum nipple and flange. From nipple to nipple aluminum reinforcing wire is wound spirally, and sometimes two lengths of wire are used to obtain added strength and stiffness. Where one ply of wire is used, the bore of the hose is always smooth, the wire being hidden by the various plys of rubber. In two-ply hose the bore may be either smooth or rough, depending on the uses to which it may be put. Some companies prefer two-piece nipples, with the flanges cast separately, while others prefer the one-piece nipple with flange cast integral with the nipple.

The suction hose is used in transferring gasoline or oil between tankers and dock. It is made by wrapping sections of uncured rubber and frictioned duck around a long mandrel. Then, if a two-ply aluminum reinforcement is desired for a hose with a smooth bore, wire is wound in a spiral around the rubber core. If a rough bore is preferred, the wire is wrapped first. Additional lengths of rubber sheet are placed over the wire. The mandrel is then placed in a vulcanizer and the rubber is cured. Great emphasis is placed on the firm adhesion of the rubber to the nipples, for great strength is required of both rubber and metal. The hose must be leak-proof, for a leak can cause conflagration which may result in loss of life and property.

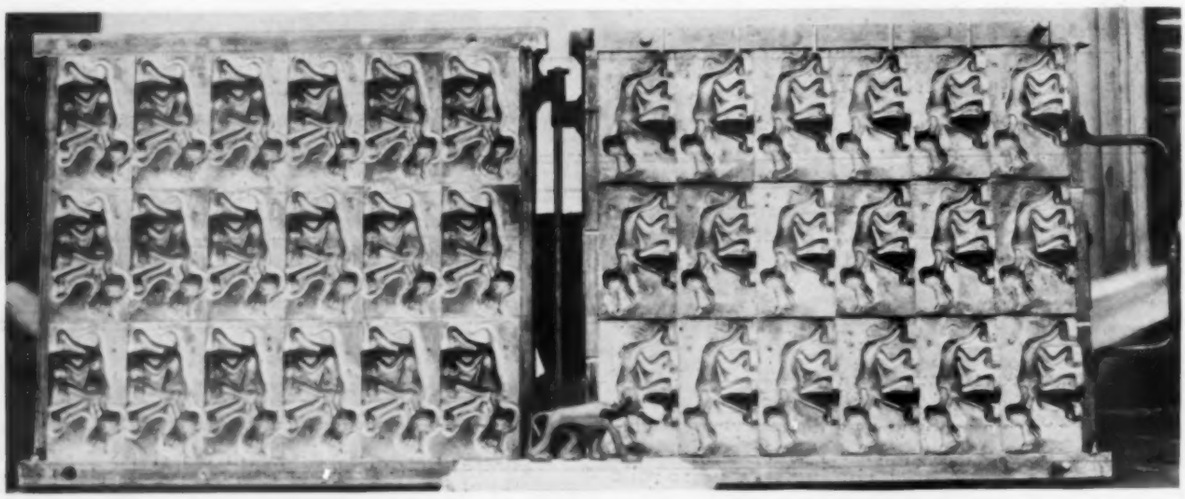
The lightness of aluminum facilitates the handling of the hose; less labor is required in connecting it. Light-weight aluminum is also helpful during assembly, for shop workers find it easier to handle than other heavier wire. Aluminum is used for oil suction hose because of its non-sparking qualities and resistance to corrosion. It adds to the safety of the equipment.

Another of the newer uses is the manufacture of tire rims for bicycles, trucks and buses. These aluminum rims are not only lighter in weight and more rigid than the older type of rim, they are also resistant to corrosion. Lightness is a principal advantage here, for by the use of a lighter material the unsprung weight of the vehicle is lessened. For better performance as much unsprung weight as possible should be eliminated. This not only lessens tire wear, but also causes less inconvenience to passengers. Light-weight wheels start and stop quickly, perform better on turns, and consume less energy.

Aluminum serves a very useful purpose in the rubber plant when made into safety caps for shear plates. The function of a shear plate is to prevent a mill roll from breaking under severe overloads. Tremendous pressure is exerted on the steel rolls which calender rubber. When an overload occurs, the shear plate is the first to fail, thus relieving the rolls from the load. Safety caps of aluminum are placed in such a position that they take the brunt of the thrust of the roll axle. Their strength is accurately estimated. They are so designed that they will give way before the roll breaks. Aluminum was chosen because it has less variation in shear value from piece to piece.

Increased Use of Aluminum Molds

The manufacture of rubber articles, such as dolls, balls, toys and small parts, is often accomplished by the use of a few molds rather than a great number. When only a few are needed it is uneconomical to make them from die castings, for the prorated cast of the die for the small numbers is rather high. Yet it is imperative that a finish comparable to that of a die casting be obtained. A number of mold manufacturers have solved this problem by the use of a process which produces a pressed permanent mold casting. Molten aluminum is poured into a cast iron box. As the metal solidifies, the matrix is forced into the hardening metal at pressures of from 2,000 to 3,000 lb. per sq. in. This procedure gives great density and a beautifully smooth finish to the mold surface.



Multiple molds, like this one of Pluto the Pup, used by Seiberling Latex Products Company, are often made of aluminum.

The extreme accuracy of a die casting is found in the aluminum pressed inserts made for tire molds. Wrought material is heated to the forging temperature and then pressed, much in the same manner as the pressings described above. The desired shape of the finished product must be fairly simple, if advantage is to be taken of the pressing, for it is impossible to make undercuts by this method.

Adhesion and Non-Adhesion Problems

The questions of adhesion and non-adhesion—as they pertain to aluminum—have been exhaustively studied by the rubber industry. The fact that aluminum did not adhere to rubber was one of the principal reasons for its use. But suppose, for a certain job, a metal was wanted which would adhere firmly to rubber. Aluminum, under ordinary conditions, would be unsuitable. Yet its many other qualities for use with rubber made the consideration of this metal very tempting. If aluminum could adhere well to rubber, then it could be used for tractor track links, valve stems, water bottle unions, and many miscellaneous parts. A start was made by using aluminum powder in the manufacture of solid rubber tires. It was found that this use increased the adhesion between the metal band and the base. Several cements and coatings have been developed which give good adhesion of rubber to aluminum, especially on small parts.

Other possibilities suggest themselves. Aluminum foil may replace Holland cloth in the calendering of rubber. Thin sections of rubber are sometimes separated with difficulty, and the foil may help to preserve the perfectly smooth surface needed for certain work.

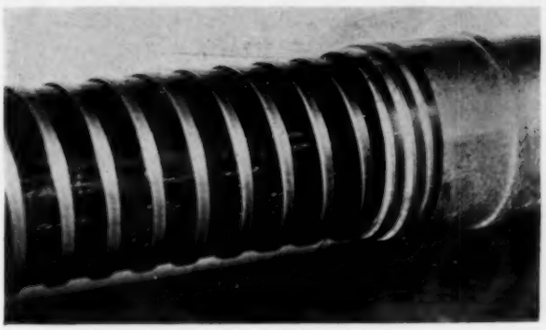
More extensive use of a processed bauxite residue as a pigment material for rubber is anticipated. Bauxite is the ore from which aluminum is obtained, and the residue is an inert powder which acts as a filler. Aluminum monohydrate and trihydrate have shown some promise as a reinforcing agent in certain rubber compounds.

Aluminum foil as a package for rubber goods is coming into vogue. By packaging rubber in this manner, it is protected from light, its worst enemy, for the thin wall of foil is opaque and does not permit light to strike the rubber.

The outstanding property of aluminum and its alloys is lightness. Aluminum weighs only a third as much as iron or copper, and is thus particularly adaptable to movable equipment such as molds, forms, curing trays, tire building drums, and cores. Weight saving reduces operating fatigue, minimizes the possibilities for accidents, increases production and lowers operating costs.

The lightness of aluminum has brought about the renovation of existing plant equipment, and in each case has saved thousands of dollars which otherwise would have been spent in rebuilding. The substitution of light alloy castings, shapes and plate for heavier materials in conveyors, housings, and rubber working machinery has eliminated the need for costly building operations and for the modernization of structures not designed to carry heavy equipment.

Aluminum and its alloys will conduct heat rapidly, with better heat transference than is obtainable with most common metals. Aluminum will conduct heat four times as well as iron, and, when in contact with steam, will not form a scale, thus eliminating the cause for cold spots in equipment such as tube molds. It is extensively used in dipping and curing forms for articles made from liquid latex. There rapid heat transfer is essential.



The beginning of an oil suction hose: uncured rubber is laid on the mandrel, heavy aluminum wire is wrapped around this form and attached to the cast aluminum nipple at the end, additional rubber is laid on top of the wire, and then the entire hose is cured in a heating chamber.

Particular pains are always taken in the rubber industry to avoid the possibility of contaminating the various products with foreign particles. It has been found advantageous to cover the wooden table tops in mixing rooms, calendering shops, and making-up departments with aluminum sheet. Aluminum is also used in lining storage bins and any surface against which rubber, from uncured bale to finished product, is placed.

Other uses of aluminum in the rubber industry include molds for mechanical and molded goods, sponge rubber and hard rubber goods, mandrels for curing puncture-proof tubing, forms for latex dipping, garden hose couplings, full circular tire retreaders, full circular tread inserts for tire molds, full circular retreading molds with steel tube for the steam chamber, tube and tire molds of the individual vulcanizer type, conveyor links, heater tree connections, mandrels, airplane wheels, foil for curing hard and soft rubber, rivets for airplane wing de-icers, tire building drums and cores, machine parts, extruded sections for making mechanical molds, tracks, tumblers, conductor cable and bus bar, latex cups, coagulating pans and tanks. Much aluminum is used in the anode process, too, where dipped goods of exceeding fineness and strength are manufactured.

Miniature Tires from Aluminum Molds

Highly competitive as the rubber industry is, it dares not take a chance on losing any business. When a manufacturing concern brought out an aluminum wheelbarrow last spring with a pneumatic tire instead of the usual iron one, rubber companies jumped to produce the desired tire, even though there was no hint of a great future market. The tire was made in an aluminum mold. The aluminum wheelbarrow made a hit. As a result, many rubber tires are now sold for this new use.

Similarly, the Soapbox Derby started out a few years ago as an annual affair held in a few localities. It was a success from the start. Competitors in the derby are boys between nine and fifteen who make their own racers in their backyards, then try for the prize late in August. While the rules of the derby prevent the boys from spending more than ten dollars on their vehicles, they realize the value of good tires, and how much these can do to help them win. And so, while the rest of the racer may be made from packing boxes and junkyard axles, the tires are usually pneumatic and are made of the best rubber procurable. These tires, too, are made in aluminum molds.

Rubber Exhibits at the Great Lakes Exposition

SEVERAL rubber manufacturers are among the exhibitors at the Great Lakes Exposition, in Cleveland, being held in commemoration of the centennial year of the incorporation of the community as a city, with the exhibit of the Firestone Tire and Rubber Company being the most prominent, in addition to being the largest exhibit of any one manufacturer or organization at the exposition. Other rubber manufacturers displaying their wares include the Ohio Rubber Company, the Forest City Rubber Company, and Goodyear.

The Firestone exhibit, housed in its own building, is situated at the eastern end of the boulevard which runs between the Automotive and Hall of Progress Buildings on the exposition grounds. In the foreground of the building are the now-famous singing fountains, skirting a pool, and surrounded by a flowered lawn. A replica of that exhibited by Firestone at the World's Fair, in Chicago, the sprays of the fountains, which change colors by means of a battery of colored lights, are seen for many miles around.

Inside the building Firestone has on exhibit a wide variety of rubber products. One interesting section is given over to the actual production of miniature rubber automobiles, all the steps from the raw material to the finished product being shown the visitor. As a souvenir, these toy automobiles may be purchased on the spot as they leave the production line. The full line of Firestone passenger car and truck tires and tubes is also on exhibit, as well as batteries, brake lining, spark plugs, and other products.

Passing through the grand archway in the center of the building, the visitor comes upon an unusual sight, one indicating Harvey Firestone's interest in the agricultural field as a growing market for rubber products. It is a typical American farm, complete to the smallest details, with real live cows and chickens adding to the authenticity of the scene.

Around the farmyard are ranged tractors and other necessary implements to the operation of the modern farm, each of these vehicles being equipped with rubber tires. The majority of this equipment came direct from Mr. Firestone's farm in Columbiana, Ohio, where experiments on rubber-tired equipment constitute a continual practice.

Rubber-tired equipment is on display in this typical American farm which is part of the Firestone exhibit.

The Firestone exhibit is rounded out with a marionette show, motion pictures of the Indianapolis 500-mile race, and Ab Jenkins' run of 3,000 miles in less than 24 hours on the Utah salt beds. There is also a motion picture showing the economical method of changing farm vehicles over to rubber equipment.

A complete line of "Cro-Pax" Foot Aids is displayed in the Forest City Rubber Company's booth. These products, prepared from adhesive combined with rubberized cloth and sponge rubber, include items ranging from corn pads to ankle supports, all of which have been marketed for some time through the syndicate stores. In addition to the foot aids, Forest City has its "Sentinel" First Aid line on exhibit, consisting of adhesive tape, cotton gauze and first aid supplies in general.

Forest City maintains a factory at Mansfield, Ohio, and an assembly plant at Cleveland, while a factory

(Continued on page 281)

A night picture of the Firestone exhibit and singing color fountains at the Great Lakes Exposition, in Cleveland.

Rubber Used In Handling 200-Inch Lens

Difficulty of Shipping Largest Telescopic Lens 3,000 Miles is Solved by Liberal Use of Rubber in Several Applications

THE world is aware of the extreme care and expert workmanship which went into the casting of the 200-inch Pyrex lens made by the Corning Glass Works, Corning, New York, for use in the world's most powerful telescope. Few, however, realize how important a part rubber played in the subsequent handling of this valuable piece of glass—its packing, shipment, finishing operations, etc.

Months of careful planning and research preceded the day when the molten glass was poured into the mold for the casting of the lens, followed by endless weeks devoted to the gradual cooling of the mammoth piece of glass. Eventually, the glass cooled, the Pyrex lens was removed from the mold and was found to be perfect in every respect.

Crate Dimensions Restricted

The next and final problem faced by Corning was that of preparing this 20-ton glass for shipment by train to the laboratories of the California Institute of Technology, located 3,000 miles away in Pasadena. The diameter of the glass necessitated its shipment in a vertical position. But even then, owing to its size and the limited clearances of the railroads, it was necessary to restrict the dimensions of the crate and the thickness of the protective cushion between the glass and the crate. In view of these limitations extreme care had to be taken in the design of the crate and the choice of materials used in its construction.

Fig. 1—Section of the sponge rubber pad, ½-inch thick, which was placed between the metal crate and the Pyrex lens.

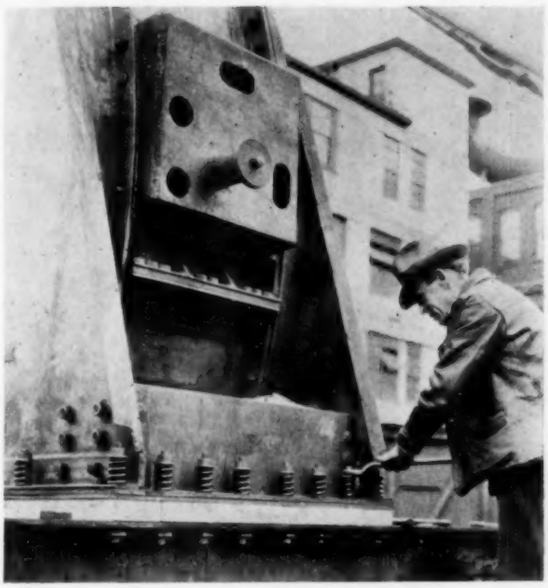


Fig. 2—Definite pressure was maintained on the gum rubber pad separating the crate from the car by means of spring bolts.

The crate consisted of a metal band of ¼-inch steel plate and two covers of fabricated structural steel. The band was bolted around the disc and the two covers bolted to the band around its two edges. Between the metal band and the glass was placed a protective pad of sponge rubber, ½-inch thick, supplied especially for this purpose by Goodrich. Fig. 1 shows this pad prior to application of band. Sponge rubber was selected for this service because it was the one material which, at this reduced thickness, provided the necessary cushioning and shock absorbing qualities required for the safe handling of the fragile cargo.

Although this 20-ton glass is nominally classified as a 200-inch lens, its actual diameter is 202 inches. As a result of the reduction of crate size which was made possible through the unique combination of rubber and steel, the 202-inch lens was successfully transported the 3,000 miles in a crate whose outside dimensions measured only 204 inches.

Additional Uses of Rubber

In addition to the use of sponge rubber, a pad of gum rubber, ½-inch thick, separated the crate from the flat car and a definite pressure was maintained on it by means of a series of bolts and springs, as shown in Fig. 2.

Upon arrival in Pasadena the lens was removed to the Institute's specially equipped laboratory where it will remain for many months while undergoing grind-

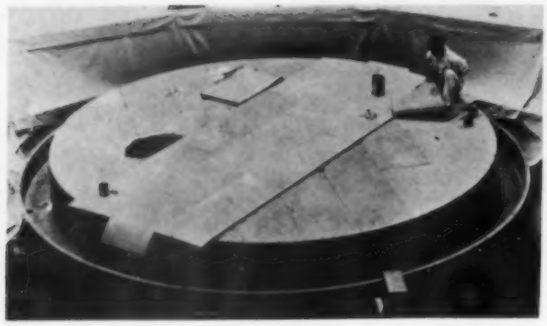


Fig. 3—Entire top of the metal table on which lens will rest is covered with two layers of 1-inch thick sponge rubber.

ing and polishing operations. This work involves the removal of approximately two tons of glass from the surface of the disc. The delicacy with which it must be done can best be appreciated by the fact that the surface of the lens must be ground and polished to an accuracy of within two millionths of an inch. Danger of surface distortion through excessive heat generation restricts these operations to very short periods, followed by long periods of cooling.

Throughout the grinding and polishing operations, the glass will rest on a large circular metal table which is supported on a heavy structural steel base. Here again sponge rubber is used as a cushion between lens and the metal table. The entire top of the table is covered with two layers of 1-inch thick sheet sponge rubber (Fig. 3).

Greatest care had to be taken in the manufacture of this particular material to insure absolutely uniform porosity. Any variation in this respect would cause different pressures on the glass which might lead to serious errors in the grinding process. The sponge rubber sheets were attached with Plastikon, a rubber cement made by Goodrich, which gives perfect adhesion to metal, is waterproof and will not become brittle.

The metal table is so designed that it can be tilted into a vertical position to facilitate mounting of the glass (Fig. 4).

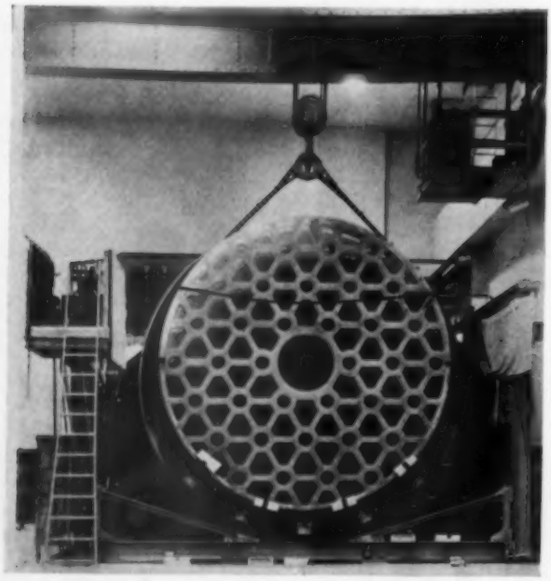


Fig. 4—To facilitate mounting of the lens the metal table has been designed so that it can be tilted into vertical position.

When completed the lens will be removed to its home on top of Palomar Mountain in San Diego County where it will be mounted in a telescope weighing 850 tons and housed in a dome 125 feet high. It will be ten times more powerful than any telescope now in use and will have a light-gathering power two million times that of the human eye.

Chlorinated Rubber in Paints

THREE main stumbling blocks to the scope of chlorinated rubber finishes are represented by sensitivity to high temperatures, solubility in organic solvents and breakdown on exposure to ultra-violet rays, points out an article in a recent issue of *Paint Manufacture* (London). In these three respects chlorinated rubber behaves somewhat like rubber itself. Photo-chemical decomposition is automatically eliminated, according to the article, by the incorporation of pigments which (with the exception of whites) insures retention of the excellent initial gloss of chlorinated rubber coatings for a period of years.

Dr. Schultze, noted German bio-chemist, discussing the chlorinated rubber question before the recent Berlin Corrosion Conference, stated that heat-sensitivity will always remain an inseparable difficulty with chlorinated rubber. In this connection, exposure to warm liquids may have disastrous results, and chlorinated rubber paints, according to Dr. Schultze, are not likely to prove particularly efficient when exposed to warm liquids at temperatures exceeding 60° to 65° C. The considerably higher limit of 105° C. has been found permissible, however, where dry heat is concerned.

Apart from their unquestioned anti-rusting value on ferrous metals, chlorinated rubber paints also provide satisfactory protection on aluminum and its alloys, as well as on other metals. Indispensable for successful results, however, is the thorough degreasing and drying of the iron surfaces since fats react unfavorably upon the drying and adhesive qualities. Special primers have been developed, since drying oils do not give the best results when the coated structure is constantly exposed to water or a high degree of humidity.

In place of the usual red lead-linseed oil primers, chlorinated rubber-red lead primers containing certain synthetic, unsaponifiable plasticizers have been successfully employed. These special priming compositions require a surprisingly short interval for attaining the dust-dry stage. It is asserted that a red lead-chlorinated rubber primer is sufficiently hard and water-repellent within thirty minutes after application to be resistant to the action of rain. Under acidic conditions the chlorinated rubber primers have shown good durability over a period of years, while their hardness and adhesive strength result in a considerable reduction in damage during transport and assembly of constructional materials.

Unsaponifiable plasticizers must again be incorporated if the finishing coat is likely to be exposed to water, salt solutions, alkaline liquors, waste liquors from technical processes, etc. Under these conditions, the article concludes, the pigment content should not exceed 50% and should be of maximum fineness. Ordinary chlorinated rubber paints dry with extraordinary rapidity to a tack-free condition, but thorough drying takes a considerable time owing to the remarkable obstinacy with which the last traces of solvent are retained.

Testing Rubber Footwear

After Results of Both Laboratory and Service Tests Are Obtained Confidence May be Placed in the Former for Predicting Actual Wear

By W. E. Glancy

Manager of Laboratories, Hood Rubber Company, Inc.

THE rubber footwear division, unlike some other branches of the rubber industry, such as the insulated wire, automotive parts, and mechanical goods divisions, disposes of its products to distributors and consumers who do not need to consider further fabrication, and who for the most part buy without reference to standard specifications. The United States Government, to be sure, does buy large quantities of footwear and specifications have been written to cover its requirements, but in almost no other case is this true. Accordingly, the good name of the manufacturer, and experience in the use of such goods are very important factors in the making of commitments.

In view of this situation, this paper considers testing from the point of view of the manufacturer rather than of the buyer.

Footwear Antedates Tires

Rubber footwear factories antedate tire factories and the earliest rubber footwear was not vulcanized at all. Later on it was vulcanized in hot-air, wooden box heaters which had no or, at best, very poor circulation. With the advent of improved compounding methods, better equipment and engineering, pressure vulcanizing, and advance in every direction, it was only to be expected that the evaluation of these changes through testing would be a prime requisite for a footwear producer.

Hence, testing on an increasing scale was practiced by all companies. There were some fantastic attempts to duplicate actual wear through machines which would simulate walking. Experience with such devices was rather unsatisfactory and inconclusive, and chemists and control men obtained more valuable information by cutting up the article, testing it by hand for correctness of cure, adhesion of parts, etc.

There were no satisfactory machines for the determination of tensile strength of very thin rubber such as found on a rubber shoe upper and so machines were developed for this purpose. A photograph of such a machine is shown in Fig. 1.

This machine has been in service for 25 years and is still doing good work. It is used for determining tensile strength and elongation, adhesions, and hysteresis tests. One feature which was unique to this machine for many years is the means of correcting for the thickness of the specimen, and consequently it is possible to reproduce stress-strain curves automatically. The chart on which such a stress-strain curve is drawn indicates the tensile strength at break in pounds per square inch.

This paper was presented at the symposium on the "Limitations of Laboratory and Service Tests in Evaluating Rubber Products," held in Atlantic City, N. J., on July 2, under the auspices of the American Society for Testing Materials, during the 39th Annual Meeting of the Society.

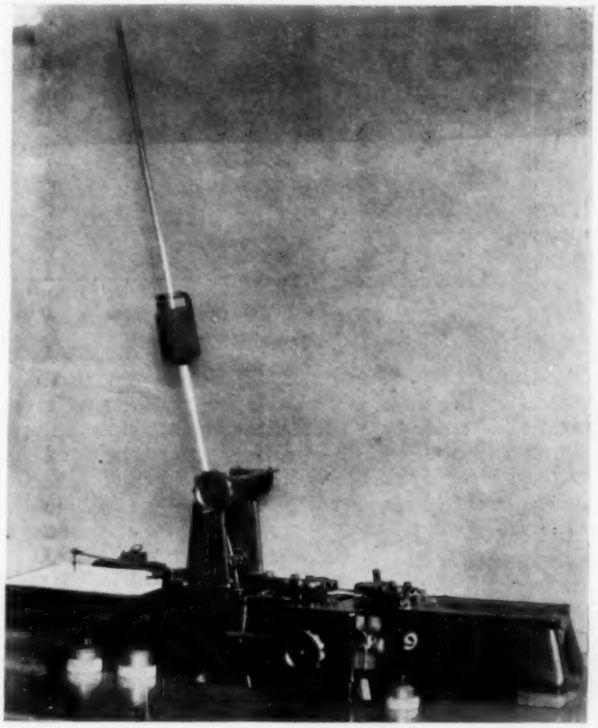


Fig. 1—Hood Rubber Co. Rubber Tester

The resistance of rubber goods to aging was in the hands of men who used their best judgment in compounding and vulcanizing, but who did not have adequate tools until Dr. Geer developed his artificial aging test. Then it was possible to feel greater assurance about the daily production because results could be obtained in 2 weeks instead of 2 years.

Modern Laboratory Testing

Today the testing of rubber footwear is as complete a procedure as may be found in other branches of the rubber industry. Both laboratory and service tests are considered to be very necessary helps to the producer. The question has been raised as to which is the more valuable. Experience indicates that neither is a direct substitute for the other, but rather complementary to it. The kind and extent of testing will naturally depend upon the amount of production, the variety of product, and the opinion of management as to a reasonable expenditure for this purpose. New types of goods receive more attention than old established lines. Tests appropriate for one line of goods often do not apply to others.

Demand for rubber footwear has caused the pro-

duction of many kinds of goods. Aside from the common lines of light rubbers, overshoes, tennis shoes, etc., there are special uses, such as for firemen, miners, fishermen, lumbermen, farmers, creamery and garage workers, basketball players, trackmen and sport walkers. Each of these calls for a special type of shoe and the situation is further complicated by the offering of lines for different price classes and for different styles or fashions as in women's footwear.

All types of footwear are examined for correctness

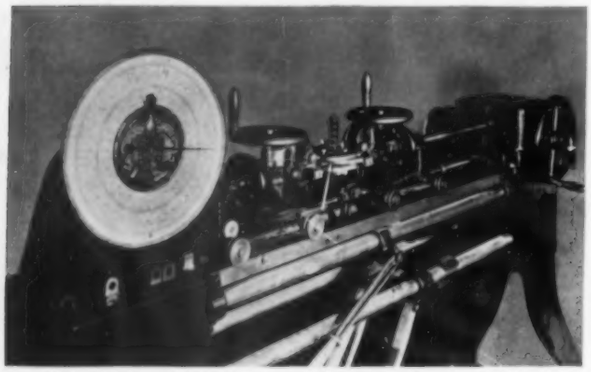


Fig. 2—Scott Fabric Tester

of vulcanization. This examination consists of a dissection of the article, the separation of the different parts and the testing of these parts both before and after artificial aging. The rubber parts are tested for tensile strength and elongation at break and adhesion tests are run to prove the bonding of one part to another. The artificial aging usually consists of exposure of the part to an atmosphere of oxygen at 300 lb. per sq. in. at a temperature of 60° or 70° C. for such periods of time as experience dictates (Bierer-Davis method). Parts are also exposed for varying periods of time in a chamber in which hot air circulates in accordance with the Geer method.

Specialists examine the daily product for any visual evidence of factory mishaps.

Boots equipped with safety-toe caps are tested for the force required to press in the reinforced portion. A fabric-testing machine with special attachment is adapted to this use. An alternative method is to drop a heavy iron weight from a height of approximately 4 feet and measure the depression caused by the weight in striking the toe. A convenient method of measuring this is to insert a cake of paraffin or other wax and note the flattening caused by the impact.

Very flexible fabric-lined shoes are tested for this flexibility feature by measuring the force required to stretch the combined fabric-rubber through a specified distance.

Eylet-Removing Test for Gripping

Articles equipped with eyelets are subjected to an eyelet-removing test to note the gripping power of these parts (Fig. 2). This same machine with a slight alteration is used for testing safety-toe caps.

Resistance to cracking through flexing is determined by means of a De Mattia type flexing machine.

Light exposure of dyed fabric uppers, as well as of rubber parts, is considered necessary. Practices differ but natural weathering with and without glass protection, ultraviolet arc light, and Fade-O-Meter are all in use.

Still another test to which canvas uppers are subjected is the "comfort" or breathability test, which consists of measuring the rate of flow of air through the fabric by means of a Gurley densometer (Fig. 3). This machine can be used to measure the time required for 100 cu. cm. of air under constant pressure to pass through a circular area of about 2.9 cm. diameter (1 sq. in.)

Heels and soles are tested for hardness by means of a Shore durometer.

And then of course resistance to abrasion is of constant interest for all classes of goods. This is determined by cutting out specimens from the article and using some one of the machines which have been developed for this purpose.

Service Testing

Despite all precautions which may be taken in designing, manufacturing, and laboratory testing, there still remains the question of wear. The tests which have been described are all very useful in determining and maintaining quality, but they do not answer other questions such as correctness of construction, insufficiency or waste of material at certain points, proper fit, or other unexpected results which have a way of developing in new articles.

So it is that basketball teams may be completely

Fig. 3—Gurley Densometer

equipped with test shoes because of the severe service which they offer. Shoes are sent to Florida to take advantage of the light and heat effects when northern communities are still having winter. Garages and creameries are very suitable places for comparisons of goods which are to be subjected to the softening effects of oils and fats. Fishermen and miners use rubber boots and "pacs" regularly and are very useful for service testing. At times men and young women are hired to walk daily, testing out new types of goods. Such walkers travel over a prescribed course and register at widely separated points to give evidence of their actual service.

And lastly there is a group of boys and girls (which

often numbers 75) who wear test shoes. Once each week, those who have such test shoes report to have their shoes inspected by trained workers and by others who are interested in the specific tests. In this manner, any tendencies toward poor service are promptly found.

Finally, there comes the interpretation of results and the correlation between service and laboratory tests. Peculiarities of the walker or unusual service conditions sometimes give puzzling results. Such discrepancies may be discovered and allowed for by conducting a sufficient number of tests or by mismating different shoes and then repeating the tests, so that any one type will receive both left and right foot wear by the same walker. Structural weaknesses or poor workmanship come to light in ways common to most of the shoes under test, and may be corrected after proper diagnosis. Poorly wearing rubber compounds may be interpreted in terms of the physical properties of the stocks as shown by laboratory tests. In general these service tests result, as might be expected, from a study of the laboratory data.

Summary

Laboratory and service testing in the rubber footwear industry are considered desirable and neither is sufficient in itself. If one were compelled to dispense with either, service testing would be retained.

The laboratory, however, offers advantages for any rubber manufacturer, as, for example: (1) quick results, (2) assistance in assuring uniformity and proper aging, (3) positive evaluation of equality free from the variables of service testing, and (4) money-saving alternatives.

After service testing has been carried on and laboratory standards of the same article established, a high degree of confidence may be placed in the laboratory tests for the control of further production.

Rubber at Great Lakes Exposition

(Continued from page 276)

at Toronto handles Canadian sales. W. E. Crofut, president of the company, sailed for England last month with the intention of opening a branch factory in Nottingham.

In the Lakeside Exhibition Hall at the exposition the Ohio Rubber Company, of Willoughby, Ohio, has on exhibit its varied line of rubber products, including automotive products, mechanical rubber goods and molded articles of various kinds.

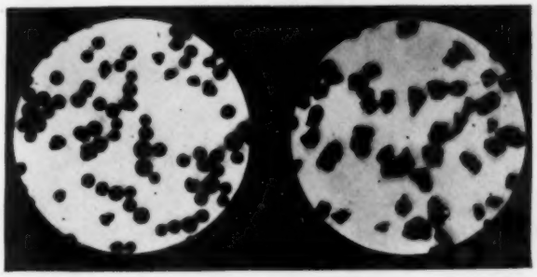
Goodyear has confined its connection with the Great Lakes Exposition to promotion purposes. Although it has no direct exhibit on the grounds, two Goodyear blimps have been assigned to the Great Lakes, reporting from Akron daily, and carrying passengers on rides. Changing neon signs on the blimps tell a story of Goodyear tires each night.

On the blimps, passengers are handed a little "log book" of the trip. The "book" is devoted to Goodyear's skyway development, one section informing the reader of the part the company plays in the general advancement of aeronautics. Two pages are also devoted to the story of Goodyear tires.

In addition to exhibits of industrial interest, the Great Lakes Exposition includes a wide variety of entertainment features of all kinds, similar in scope to those at the Chicago World's Fair and to the current Texas Centennial and San Diego exposition.

New Dustless Carbon Black

INTRODUCTION of a new dustless type of carbon (gas) black has been made by the United Carbon Company, of Charleston, West Virginia. Called Kosmobile 66 and Dixiedensed 66, these blacks are described as free flowing products offering the advantages of being clean to handle and of reducing the possibility of flying dust, on mixing with rubber on the mill, to a minimum. They are irregular in shape and possess a construction that is sufficiently strong to withstand handling, yet are stated to be of such texture as to insure immediate disintegration when subjected to the action of the Banbury and mill. In conjunction with their dustless characteristics, Kosmobile 66 and Dixiedensed 66 are said to have good processing and reinforcing properties for rubber compounding and to be manufactured under the most rigid control, assuring a high uniformity of quality in their physical and chemical characteristics.



Photomicrographs showing irregular shape of Kosmobile 66 (right) in comparison with regular Kosmobile (left).

Z-M-L—A New Accelerator

A NON-DISCOLORING mercaptobenzothiazole type of accelerator, termed Z-M-L, which is said to be suitable in almost all types of rubber products, has been introduced by the Naugatuck Chemical Division of U. S. Rubber Products, Inc. The new accelerator is also said to be particularly useful for proofing, footwear and other air cured products when activated with a dithiocarbamate accelerator (such as Monex) or a guanidine.

Z-M-L is a solid, light yellow in color, and has a specific gravity of 1.424. Its solidifying range is from 85°C. down to 75-70°C., depending on the rate of cooling and stirring. It is insoluble in water, partly soluble in alcohol, and slightly but completely soluble in warm benzene. In addition, the new accelerator is chemically stable and is not affected by light or by storage over long periods of time, according to Naugatuck. Its composition consists of 75 parts of Laurex and 118 parts of the zinc salt of mercaptobenzothiazole, the latter being the equivalent to 85% of its weight of Captax.

Advantages claimed for Z-M-L by its manufacturer include the following: complete solubility in rubber and low melting temperature insure perfect dispersion; it provides one material combining the accelerator with sufficient zinc salt of fatty acids (Laurex) so that no added fatty acid need be used in ordinary compounds; the Laurex present in the accelerator exerts its usual plasticizing effect; and Z-M-L is non-staining, non-discoloring and odor is reduced to a minimum.

Russia's Synthetic Rubber

(Continued from page 272)

but that shorter life is explained by increased speeds and loads of cars, particularly of lorries.

It is true that the rubber grown on the Soviet plantations is of higher and more even quality than that of other countries owing to its greater uniformity, the various improvements introduced into the plants, and so on; it must, however, be stated that the synthetic rubber is still superior and all the indications are that further improvements will be made in its quality.

Soviet synthetic rubber is already superior to the natural product by its endurance, length of life, and resistance to heat. Another great quality of synthetic rubber is the complete uniformity possible in its production.

The utilization of synthetic rubber is to be extended to other branches of Soviet industry. Synthetic rubber will be used in the production of artificial leather, for the manufacture of rubber shoe wear, and for other consumption goods. Such shoe wear is much more elegant, light and durable, and costs only half or a third the price. The Skorokhod factory is already producing a substitute for chamois leather from synthetic rubber.

Rubber of various degrees of porosity and at the same time waterproof, can be obtained from synthetic rubber when worked up with nitrogen under high pressure. The specific weight of such rubber can be reduced to 0.2 to 0.07, that is to only half the weight of cork. At the same time it is sound-proof, waterproof and heat-proof. Such rubber can be utilized for aviation purposes, water transport and in many other branches of national economy.

Soviet synthetic rubber is to play an important part in the introduction of technical progress in the rubber industry. The introduction of synthetic rubber has enabled the transfer of production of rubber shoes from the old hand method to the casting method of the present time which is considerably quicker and reduces the possibility of waste.

The introduction of the Stakhanov movement created new possibilities for the development of the synthetic rubber industry. By 1937 the whole requirements of the U.S.S.R. will be satisfied from home resources. The instructions of M. Ordjonikidze, People's Commissar for Heavy Industry, that 1936 should be the last year for the complete mastering of the production of synthetic rubber in all branches of the rubber industry must and will be carried out, at the same time the workers in the synthetic rubber industry will do everything to improve their production still further and thus help the rubber workers.

Effect of Light on Goldenrod

IT has been definitely established that the leaves of the many wild species of goldenrod (Solidago) contain rubber, one series of experiments indicating that as much as 3 to 6% can frequently be found, while the experiments conducted by the late Thomas A. Edison, at Fort Myers, Florida, indicated that cultivated goldenrod would yield as high as 13% of rubber. These experiments proved that the rubber content increases with the maturity of the leaves, but as soon as the leaves die they lose most of their rubber, whether remaining on the plants or lying on the ground.

With a view to learning whether light is a factor in the rapid decline of rubber in the dead leaves, the U. S. Bureau of Plant Industry conducted tests in which samples were exposed to the sunlight in Cellophane envelopes of different colors for various periods of time, the use of transparent cellulose in this connection having been suggested by previous work on light sensitive lettuce seed conducted by Lewis H. Flint. The tests conducted by the U. S. Bureau of Plant Industry were described in a recent issue of *Science* by John T. Presley, a member of the Bureau.

Three species of Solidago were included in the test, *Solidago leavenworthii, S. altissima* and *S. fistulosa,* and the leaf samples were exposed in red, blue, green and clear envelopes. Check samples in black paper envelopes were exposed with the colored envelopes. The leaves exposed in the red, green and blue envelopes showed notable losses in rubber content, and those in the clear envelopes lost most of their rubber, while material from the black envelopes showed no loss, but often a gain.

Samples of *Solidago leavenworthii,* which analyzed 4.39 per cent of rubber at the beginning of the experiment, gave the following percentages after one week of exposure in the different envelopes: clear 3.38, red 3.63, green 3.75, blue 3.89 and black 4.72. The corresponding percentages after two weeks of exposure were 1.98, 2.69, 2.74, 3.28, 6.27; after four weeks 2.00, 2.69, 2.94, 3.28, 6.00; and after six weeks 1.81, 2.25, 1.97, 2.65, 5.98.

Results with the other species were consistent, and the data leave no doubt that light is a factor in reducing the rubber content of goldenrod leaves.

Analyses were made later of leaf material from the envelopes that had been exposed and then stored for several weeks in the laboratory, and it was found that the rubber content of the leaves in the black envelopes had not declined but had increased, while material from the colored bags showed a further decline in rubber content.

Thus the black-envelope sample of *S. leavenworthii,* that analyzed 6.27 per cent after two weeks' exposure in the field, contained 7.34 per cent after six weeks in the laboratory, and likewise the samples exposed for four and six weeks increased after two weeks in the laboratory, from 6.00 to 7.12 and from 5.98 to 6.70, respectively.

These data were obtained from samples grown at Glenn Dale, Maryland, and were confirmed by samples from Savannah and Fort Myers, Florida.

Rubber Outings of Yesteryear

STARTING with this issue, THE RUBBER AGE is presenting a series of photographs of outings and picnics held by various rubber organizations two and three decades ago. On the opposite page two photographs are reproduced, the one at the top showing the group which attended an outing of the New England Rubber Club, forerunner of the Rubber Manufacturers Association, in July, 1906; the second represents the attendants at an outing of the same group held a year or two later, in 1907 or 1908, the exact date not being known. Both of these photographs are reproduced through the courtesy and cooperation of Alfred A. Glidden, of the Hood Rubber Company, Inc., Watertown, Mass.

This series of former outings is being presented for the edification of our readers. It should be interesting to examine each reproduction as presented and attempt to identify the individuals in each case, many of whom are still actively associated with the rubber industry. How many do you recognize?

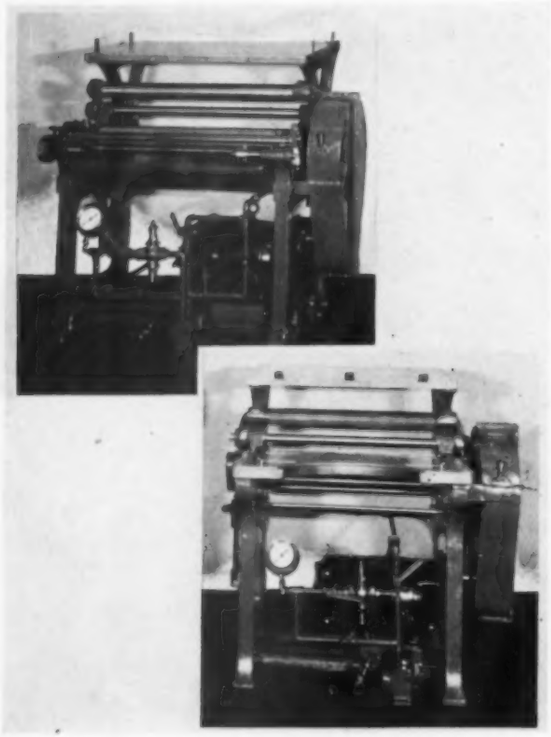
Rubber Outings of the "Good Old Days"

(See lower right hand column on the opposite page for details of these outings)

New Equipment

Farrel-Birmingham Hose Machinery

FACILITY of control and ease of operation are said to be the leading features of two redesigned machines for making, covering and wrapping air brake and radiator hose just introduced by the Farrel-Birmingham Company, Inc., Ansonia, Connecticut. One machine accomplishes the making and covering of the hose, the second being used in the wrapping operation.



Top: Farrel-Birmingham Hose Wrapping Machine.
Bottom: The Hose Making and Covering Machine.

After the friction stock is applied to the inner lining of the hose and the outside cover stock, and brands or trade marks are applied in the making and covering machine, the mandrel and hose are transferred to the wrapping machine. In this machine the wrapping is removed from a cured hose and simultaneously applied to a piece of uncured hose. A continuous spray of water is directed on the wrapper as it passes from the cured to the uncured hose. Excess water drops into a cast iron pan under the rolls and is carried away by pipe connected to the pan.

In both machines the lower rolls are driven by multi-V-belt from a 3 h.p. geared motor mounted under the machine. The connecting gears of the lower rolls are machine cut. Gears and belts are fully guarded. The top roll revolves by contact with the hose as it is rotated by the two lower rolls. Pressure is applied to the top roll by compressed air, providing substantial, constant and even pressure, which results in a tightly wound and uniformly wrapped hose. Air pressure also raises the roll to its top or open position, thereby eliminating counterweights.

Electro-pneumatic control of the roll operating mechanism, actuated by a foot operated air valve and interconnected with the driving motor, facilitates control by providing automatic starting or stopping of the machine. The motor is equipped with a fully enclosed disc type solenoid brake.

The usual unit consists of one combination making and covering machine and one wrapping machine as seen in the illustration. These machines are designed to handle the standard sizes of hose, 1⅛ inch and 1⅜ inches inside diameter and 22 inches to 24 inches in length, but they can also be arranged for other sizes.

Taylor Evenaction Valves

ALL-STEEL welded construction features a completely redesigned line of diaphragm valve motors recently announced by the Taylor Instrument Companies, Rochester, N. Y. This new construction is said to be lighter in weight, stronger, and to have greater resistance to shock and strains than other types. A smoother, quicker-acting valve motor is obtained, according to Taylor engineers, by means of a larger molded diaphragm of advanced design, as well as by formed impressions in the top plate which provide freer access of air pressure to the diaphragm in starting, thus insuring an effective initial force. A longer and larger diameter spring is also said to permit greater initial compression, less hysteresis and accurate response. Throughout the entire stroke, a ball-bearing, roller-bearing stem guide assures a free rolling action. Spring and spring adjusting nut, as well as other moving parts, are fully enclosed, yet are accessible for adjustment or maintenance by removing the side plates. Valve position indicator readily establishes the valve opening. All parts are said to be specially treated to resist corrosion.

Taylor Evenaction Valve

Book Reviews

Annual Survey of American Chemistry. Vol. X. Edited by Clarence J. West. Published for the National Research Council by the Reinhold Publishing Corp., 330 West 42 St., New York City. 488 pp. $5.00.

The publication of this volume completes the first decade of its existence. In each issue the editors endeavored to cover the annual progress made in American chemistry and technology, an authority in the respective fields writing the pertinent chapter. This edition contains chapters on the progress made during 1935 in electro-organic chemistry, gaseous fuels, petroleum chemistry and technology, thermodynamics and thermochemistry, ferrous metallurgy and other chemical subjects. Like its predecessors, this volume indicates by implication, if not by actual statements, the trend in the various fields of pure and applied chemistry in the United States. Complete with subject and author index, the Annual Survey deservedly merits a niche in every chemist's personal library.

•

Why Quit Our Own. By George N. Peek with Samuel Crowther. Published by the D. Van Nostrand Co., Inc., New York City. 353 pp.

Written by an international trade authority assisted by a recognized economist and author, this book, according to its preface, "has been conceived and written not in a partisan spirit, but solely in an effort to take the question of national prosperity and well-being out of the realm of mere words and theory and to discuss them on the sure basis of fact." In effect, however, the book constitutes an attack on the farm and foreign policies instituted by the New Deal administration. The introduction of each new agricultural move, its cause and effect, together with its far-reaching results, is treated with by the co-authors. Approximately half of the book consists of a reprint of six articles by Mr. Crowther which appeared under the title of "In and Out" in the *Saturday Evening Post*.

•

"Retarder W". (Laboratory Report No. 196). Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 6 pp.

The effect of "Retarder W", a retarding material described as a specially treated form of salicylic acid, on various accelerators, including Acrin, the Zenites, and others, in different stocks, such as carbon black, dry heat cured and several compounds, is treated with in this report. The advantages of the material in meeting varied requirements are discussed, with particular stress on its value in preventing bin-curing and scorching.

•

Witco Products. Wishnick-Tumpeer, Inc., 295 Madison Avenue, New York City. 136 pp.

Data on more than fifty of the various chemicals, oils and pigments manufactured and sold by Wishnick-Tumper, is presented in this booklet, all of it in convenient reference form. Technical information, specifications, properties, applications and general commercial information are covered. The booklet is indexed by consuming industries and then grouped into sub-classifications. The complete Witco line for the rubber industry is, of course, included.

•

Pneumatic Equipment for Horse Drawn Vehicles. By Alexander Hay. Published by the Rubber Growers' Association, 19 Fenchurch Street, London, E. C. 3, England. 20 pp.

This is another in the series of booklets being written by Mr. Hay, associated with the R.G.A., to further the use of rubber products in the agricultural industry. It describes and illustrates several current uses and suggests many more.

Boiler Feed Water Treatment. By F. J. Matthews. Distributed by the Chemical Publishing Co., of N. Y., Inc., New York City. 256 pp. $5.00.

Covering the well-established processes of water softening and the usual methods of control, this book, published in England and distributed in this country by the Chemical Publishing Company, also gives a succinct and easily understandable account of methods of treating boiler feed waters developed in the past decade. In addition to describing the characteristics of various natural boiler waters, it treats with the action of sodium aluminate as a softening agent, zeolite softeners, the treatment of alkaline waters, colloidal conditioning, and other topics pertinent to its subject. The theoretical considerations and practical applications are well proportioned throughout the book.

•

Z-M-L—A Rubber Accelerator. Issued by Naugatuck Chemical Division, U. S. Rubber Products, Inc., 1790 Broadway, New York City. 8 pp.

This literature describes a new accelerator, a non-discoloring mercaptobenzothiazole type, suitable for use in almost all types of rubber products. Its characterization is outlined, its advantages are discussed and data are given on its use in typical commercial stocks, including white air cured compounds, tire tread, wire insulation and molded compound stocks. Tensiles, aging and scorching results are given.

•

Pneumatic Equipment for Farm Tractors. By Alexander Hay. Published by the Rubber Growers' Association, Inc., 19 Fenchurch Street, London, E.C. 3, England.

This bulletin, the first of a series to be published by the R.G.A. on the use of rubber in agriculture, treats with pneumatic-tired farm tractors. Written by Alexander Hay, the agricultural liaison officer of the Association, it describes the development of the pneumatic tire and then goes into a detailed explanation of the advantages of pneumatic-tired tractors over tractors equipped with ordinary wheels. Such angles as fuel consumption, non-skid devices and life of rubber tires are discussed, as well as experiences with tractors equipped with pneumatic tires.

•

Government Interference with the American Industrial System. By Allen W. Rucker, in collaboration with N. W. Pickering. Distributed by the Farrel-Birmingham Co., Inc., Ansonia, Conn. 12 pp.

As its title implies, this treatise, 17th in a series of booklet-editorials prepared by the co-authors, treats with the efforts of the Government to regulate American industry. According to the co-authors, "Neither higher wage rates, shorter working hours nor rising industrial prices are the formula for business recovery" but, in the name of thousands of manufacturers, they call upon the Government for "relief from interference in business, freedom to restore flexible wage rates and working hours, and education of labor to seek higher annual incomes through greater productivity instead of through higher wage rates."

•

Falk Speed Reducers (Parallel Shaft and Right Angle). The Falk Corporation, Milwaukee, Wisconsin. 56 and 60 pp., respectively.

Issued simultaneously, these two bulletins (No. 1100 and No. 2100) fully describe the different types of speed reducers featured by Falk. Bulletin 1100 describes in detail the line of parallel shaft (or herringbone) speed reducers, with both sleeve and roller bearings, rated according to the "Recommended Practice" of the American Gear Manufacturers Association, and is complete with specifications, ratings, service factors and directions for selecting, as well as dimensions and applications. 52 different sizes in capacities from 1 to 1000 h.p. at 100 r.p.m., with 45 different standard ratios, are covered. The second bulletin (2100) describes the right angle speed reducers, both horizontal and vertical types, the units described covering a ratio range from 1.5:1 to 518:1 and ratings of 1 to 1200 h.p. at 100 r.p.m.

Editorial Comment

Testing Grounds

LABOR conditions in the Akron rubber factories have been far from satisfactory for more than three years. Settlement of the recent Goodyear five-week strike was apparently only a temporary stop-gap during the peak period of tire production, with management making the greater concessions. So often have sit-downs taken place in the factories of Goodyear and Goodrich in the past six months that the managements of both companies intimated serious reprisals. Apparently rubber labor leaders realized the significance of this intimation as viewed from the fact that the Goodyear and Goodrich locals of the United Rubber Workers went on record officially as opposing "unauthorized" sit-downs.

Although on the surface these leaders are apparently smoothing out minor difficulties, they are, in fact, girding for a major battle with the rubber factories. Three months ago the U.R.W. started an intensive organization campaign to embrace the entire industry with repercussions felt in rubber centers throughout the country. Now comes word that rubber labor has allied itself with John L. Lewis and his Committee for Industrial Organization, with the result that industrial unionization will displace craft unionism in the rubber industry. Already the Goodyear local has launched a campaign aimed at attracting membership from the office personnel.

As yet, the C.I.O., favoring industrial unionization, has to prove itself. This it intends to do in three fields, i.e., rubber, steel and automotive. These fields are "open territories," and will be testing grounds for the C.I.O.

•

Problem or Solution?

IT is freely admitted in governmental circles that the Federal Trade Commission's relentless battle to force Goodyear to "cease and desist" from granting alleged special price privileges to Sears-Roebuck was indirectly responsible for final passage of the Robinson-Patman Act which went into effect in June. The Act is frankly aimed at the abolishing of prices termed "discriminating". The report is current that Goodyear abrogated the mail order tire contract voluntarily rather than contest its purported invalidation in view of the fact that it is more concerned with its other half dozen different legal battles with the government now in various courts.

If the Federal Trade Commission senses victory in the fact that Goodyear surrendered its contract with Sears-Roebuck it will apparently be a short-lived victory. Undoubtedly the constitutionality of the Robinson-Patman Act will come before the courts within the next few months, and, according to an unofficial census of legal opinions, it is destined to be treated in the same manner as several other of the unfortunate New Deal measures.

In the interim it is difficult to foretell what effect the anti-price discrimination bill will have on "big business." For the most part the large corporations, including those in the rubber industry, have adopted a "wait-and-see" attitude. The law seems to be in a complete state of confusion insofar as its rightful interpretation is concerned, its principles applying with but little uniformity. With the statement that questions coming before it will be questions of fact and not of law, the Federal Trade Commission has announced that it will issue no rules or regulations defining what constitutes unfair trade practices under the Act.

In view of the general air of confusion surrounding the Act, the fact that its constitutionality is seriously in doubt, and other factors, it seems to be evident that in abrogating the Sears-Roebuck contract Goodyear had more in mind than legal surrender to the F.T.C. via the terms of the Act. It is possible that Goodyear reasoned that it could make use of the production alloted to Sears' tires for its own brands. There are several other plausible reasons for mutual cancellation of the contract. As far as Sears-Roebuck is concerned, it is believed that it has viewed recent Akron labor disturbances with apprehension and prefers to have available several sources of supply rather than a single source.

•

Question of Supply

THAT the current restriction scheme is working to the satisfaction of European-owned rubber estates seems to be self-evident. The price of rubber has risen to respectable levels from the producers' standpoint. Rubber manufacturers, as a rule, are not particularly anxious for a low price per pound, but do seek some point of stabilization. More than that, however, they are concerned with a ready source of supply.

If the high rate of domestic consumption continues, as is expected, and the shipment tonnage continues to decline, as it has for a period of several months, then there is the strong possibility that only a 3 to 3½ months supply will be on hand in this country by the end of the year, whereas a six months supply is considered necessary.

Since a continuation of the present statistical position, with a corresponding decline in available domestic supply, would undoubtedly force the price of rubber to abnormal heights, a situation neither the American manufacturers nor the signatories to the restriction scheme desire, it seems logical that the International Rubber Regulation Committee should take the necessary steps to avoid it, either by granting increased quotas to the respective producing countries or by permitting increased shipments, or both.

CURRENT • NEWS of the Rubber Industry

AUGUST, 1936

Robinson-Patman Act Forces Goodyear Co. to Terminate Sears-Roebuck Tire Contract

Goodyear Will Continue Its Appeal Against Federal Trade Commission's "Cease and Desist" Order, While Sears-Roebuck Turns to Eight Smaller Tire Concerns

BECAUSE the provisions of the recently enacted Robinson-Patman Law, which became effective June 19, 1936, rendered it difficult, if not impossible, to continue to manufacture special brand tires for Sears, Roebuck and Company, the Goodyear Tire and Rubber Company announced the termination of the contract between it and the mail order house on July 16. The contract, under which Goodyear has been producing tires for Sears-Roebuck under that organization's specifications since 1926, normally would have expired in 1942. No sales have been made to Sears-Roebuck by Goodyear since the enactment of the law on June 19. According to P. W. Litchfield, president of Goodyear, the company "was unable to fulfill the requirements of the contract" because of the terms of the law.

The Goodyear-Sears contract had been under investigation by the Federal Trade Commission for the last several years, the Commission alleging that it tended to create a trade monopoly and constituted "unfair trade practices." Culminating a series of hearings in leading cities throughout the United States over a three-year period, the F.T.C. handed down a "cease and desist" order against Goodyear last March.

Decision Promptly Appealed

This decision Goodyear promptly appealed to the Circuit Court of Appeals, claiming that the contract involved was not in violation of the anti-trust laws as they stood at the time the case was heard as charged by the F.T.C. Despite the abrogation of the contract, Goodyear has announced that it will press the appeal in the circuit courts.

Production of tires for the mail order house constituted 6% of Goodyear's total production, these tires being sold on a cost plus basis. Practically all of this special production was centered in the Akron plant and it is understood that Goodyear will utilize the production facilities heretofore absorbed by Sears-Roebuck's special brand requirements for the manufacture of its own brand tire lines.

In a recent issue of the *Wingfoot Clan*, Goodyear house organ, Mr. Litchfield pointed out to employes that it might have been possible to retain some of the mail order business on another arrangement if it were not for the unsettled labor conditions in Akron. He indicated that eventually two things must happen: the business must be replaced or the number of employes reduced.

Termination of the contract aroused considerable speculation as to the sources to which Sears-Roebuck must turn to get its tires. According to report, eight companies will share the business previously held solely by Goodyear, these being Fisk, Lake Shore, Pharis, Gates, Pennsylvania, Dayton Rubber, Mansfield and Inland. Although Col. Charles E. Speaks, president of Fisk, at first denied that the company had received a contract to make part of the Sears-Roebuck tires, he later admitted that Fisk will turn out such tires on "a trial order basis." Although no definite number was specified in the preliminary contract, according to Col. Speaks, he stated that Fisk could handle a good portion of the requirement since the plant has a capacity of 15,000 tires a day with 3,000 workers. Early reports indicated that Fisk would produce 4,000 tires a day for Sears-Roebuck for a six-week period with some reports putting the total trial order at 100,000 tires.

Small Companies Within Law

The smaller tire companies can produce tires for the mail order house without conflicting with the terms of the Robinson-Patman Act because they have, for the most part, no large dealer organizations whose interests would be endangered.

Up until this writing there has been no indication that the Goodyear action in cancelling the Sears-Roebuck contract would be followed by similar actions by tire manufacturers presumably in the same predicament. Both U. S. Rubber, which has been supplying tires to Montgomery-Ward since 1931, and Goodrich, which does a large private brand tire business with oil companies, may encounter difficulty with the Robinson-Patman Act if their respective contracts are somewhat similar to that cancelled by Goodyear, since both organizations sell to dealers on a wide scale.

The Robinson-Patman Act, which is an amendment to the Clayton Anti-Trust Act, is an anti-price discrimination law aimed at abolishing the buying advantages enjoyed by chain stores and mail order organizations. Its constitutionality has not yet been tested in the Federal courts, although it is practically certain that such a test will be conducted, probably in the Fall.

Cancellation of the Goodyear-Sears contract was hailed by the independent tire dealers. George J. Burger, secretary of the National Association of Independent Tire Dealers termed it "a move that will benefit all dealers." Referring to the Robinson-Patman Act, cited by Goodyear as the reason for relinquishing the $100,000,000 contract, he called it "the most constructive piece of legislation ever adopted in the nation." Calling the erstwhile contract "cancerous", Mr. Burger stated that "the tire industry from this point on will show a more definite profitable future for the manufacturer and independent dealer and we feel certain that no additional burden will be placed on the consumer."

Goodyear is expected to considerably broaden its sales and advertising campaigns on independent dealer business this Fall in an effort to replace the production lost on the termination of the Sears-Roebuck contract.

Drops Molded Ball Line

The manufacture of inflated rubber balls and sponge rubber balls "until further notice" has been discontinued by the Miller Rubber Company, Goodrich subsidiary, of Akron. The company expressed regret at the "necessity for this action" and stressed the fact that it pertains only to the lines of molded inflated and sponge rubber balls. The company is continuing its lines of beach balls, inflated toys, balloons, dolls and general novelties.

SURVEYS INDICATE GOOD TIRE POSITION

Two surveys of the tire industry, one by the *Wall Street Journal* and the other by the Fourth District Federal Reserve Bank, recently completed, indicate an excellent position as compared with recent years. Original equipment business, according to the financial paper, following the upturn in automobile production, is the highest it has been since 1929. Although the replacement business in the first quarter of the current year showed a drop of 15% in comparison with the corresponding period in the previous year, it picked up in the second quarter to reduce the deficiency to less than 3%.

Based on this favorable position, the *Journal's* survey predicts that the industry will sell approximately 51,000,000 tires this year gauged on results in the first six months, the sales being divided as follows: about 21,000,000 tires to the original equipment market compared with 16,500,000 last year; 29,500,000 to the replacement market, or approximately the same number as those sold in 1935; while export sales are expected to approximate 1,300,000 tires, or less than the 1,500,000 exported last year.

The survey conducted by the district bank finds that from a price standpoint the tire industry is in a better position than it was two years ago, with the possibility of any price war upsetting its present status being remote. This survey notes that although tire production in the first five months of 1936 was nearly 2% under the same period of 1935, shipments were up over 6% during the period. Inventory on June 1, 1936, according to the report, was 26.5% smaller than a year ago and approximately 2% less than the previous month. Inventory failed to show the usual increase in the first quarter of the year and dropped sharply in May.

The bank's report also stated that "further decentralization of the tire industry has become more audible recently and Akron now produces only 45 to 50% of all tires in this country." Akron tire executives, however, while admitting the decentralization trend, question those percentages, claiming that Akron is still producing between 55 to 60% of the country's tires.

Allot Synthetic Rubber

The German Board of Control for Rubber and Asbestos has recently issued a new set of regulations governing the distribution of synthetic rubber. According to W. S. Jesien, American consular clerk at Frankfort-on-Main, synthetic rubber, under the new regulations, will be allotted for the present only for those uses in which it offers special advantages as, for instance, to manufacturers of rubber hose for gasoline or oils or to makers of rubber packing for apparatus and pipelines. The needs and quality requirements of individual rubber manufacturers will be investigated by the control board prior to any allotment.

Coming Events

September 10-11. Rubber Division, A.C.S. William Penn Hotel, Pittsburgh, Penna.

•

October 6. Los Angeles Group, Rubber Division, A.C.S. Los Angeles, Calif.

•

October 6-7. Rubber Section, National Safety Council. Atlantic City, N. J.

•

April 12-15, 1937. Rubber Division, A.C.S. Chapel Hill, North Carolina.

•

September 13-17, 1937. Rubber Division, A.C.S. Rochester, N. Y.

RECEIVING BIDS ON INDIA TIRE PLANT

George D. Wells, who was appointed permanent trustee of the India Tire Company by the Federal Court, at Cleveland, which recently ordered liquidation of the company, reports that several proposals to take over the Mogadore (Ohio) factory have been received and are being studied by the Reconstruction Finance Corporation, the latter organization holding a $200,000 mortgage on the plant.

Although no details on any of the offers submitted have been made available, it is understood that none of them more than barely cover the mortgage held by the R.F.C. The Revenue Department has filed a claim for $132,000 unpaid excise taxes, bringing up the total liabilities to $652,440 in all.

Authority to sell the plant and assets of India Tire was granted to the trustee by the Federal Court on July 20.

Inland Building Addition

Wallace S. Whittaker, president and general manager of the Inland Manufacturing Company, Dayton, Ohio, a General Motors affiliate, has announced the construction of a new addition to the plant which will provide for 175,000 additional square feet of floor space for production purposes at a cost of $750,000. Approximately $150,000 will be spent for new equipment. The addition was required because of a steadily increasing production volume, according to Mr. Whittaker, who stated that Inland is now the largest manufacturer of rubber steering wheels, running boards, engine mountings and refrigerator trays. It produces approximately 55% of all rubber steering wheels used on automobiles, he revealed, also claiming that the plant absorbed 5,500,000 pounds of crude rubber and 12,000,000 pounds of reclaimed rubber each year. The new factory will be of one and two story brick and steel construction and will increase the present floor space to a total of approximately 640,140 square feet.

CONCERN EXPRESSED OVER RUBBER SUPPLY

Increased crude rubber consumption by American manufacturers combined with fewer shipments of crude rubber by countries participating in the restriction scheme, is causing apprehension over the future needs of this country. Although foreign sources are inclined to the belief that an adequate supply is not endangered by the present consumption-production ratio, leading American rubber executives hold that not less than a six-months' world supply is adequate.

If the present condition continues world supply at the end of 1936 will approximate only 3½ to 4 months based upon actual absorption in the first half of the year, estimated consumption in the second half, and rubber production for the entire year permitted under the restriction scheme.

World carryover at the start of 1936 was 586,000 tons, the carryover for the end of 1936 being estimated at 329,000 tons. World consumption from January through May totaled approximately 408,000 tons (according to the Commodity Exchange) and will total, it is estimated, 1,038,000 tons for the entire year. Because of this statistical position, American manufacturers are concerned with a sudden shortage of supply that will force rubber prices sky-high before the International Rubber Regulation Committee can meet the situation by increasing the quotas for exports from producing countries or allowing additional production by signatories, or both.

Appeal Patent Decision

A supersedeas action was filed by the Goodyear Tire and Rubber Company on July 20 in the U. S. Circuit Court of Appeals, at Cincinnati, to arrest execution of the judgment handed down by a district court under which Goodyear was ordered to pay $476,275 to the Overman Cushion Tire Company, of Belleville, N. J. This action was taken, according to Goodyear attorneys, pending the filing of a formal appeal from the decision handed down by the U. S. District Court, at Cleveland. This appeal will probably be filed within the next 60 to 90 days. The judgment was awarded on claims that Goodyear had violated rights on a patented hard rubber truck tire controlled by Overman, the latter company claiming that while Kelly-Springfield was an authorized licensee Goodyear had no such authorization.

Royal Handling Gastex

Herron and Meyer, Inc., New York City, recently entered into an agreement with the firm of H. M. Royal, Inc., Trenton, N. J., whereby the latter organization will represent them on the sale of Gastex carbon black in the Trenton territory. Gastex black is a product of the General Atlas Carbon Company, New York.

LOS ANGELES GROUP HAS FISHING TRIP

Thirty-six members and guests of the Los Angeles Group, Rubber Division, A.C.S., using two chartered boats, enjoyed a fishing excursion out of San Diego on Sunday, July 26. The boats pulled out at 4 o'clock in the morning, the last one returning to port by 7 P.M. Prizes were awarded only for tuna, yellowtail and white sea bass, and were won by the following:

Fred Woerner (Goodyear), Phil Drew (Goodyear), W. J. Haney (Kirkhill), Ed Royal (Royal), Al Teakle (Pioneer), H. H. Hummer (Firestone), Charles Lamb (West American), and W. R. Hucks (Goodrich). All of these were in the first boat. Prizes in the second boat went to R. R. James (Goodyear), Walter Hain (Goodyear), Ted Needham (U. S. Rubber), Walter Voth (Akron Standard Mold), Martin Breuer (DuPont), Bill Reeder (U. S. Rubber), Ross Morris (Goodyear), and Cliff F. Neville (U. S. Rubber).

Prizes, which included fishing accessories of all kinds, were donated by the following companies: American Cyanamid and Chemical Co., Blue Star Mines, J. M. Huber, Inc., H. M. Royal, Inc., San Francisco Sulphur Co., and the Western Shade Cloth Company. The Group also donated several cash prizes.

Guests accompanying the members of the Group included Al Teakle, foreman of the calender department, Pioneer Rubber Mills, Pittsburgh, California, and W. G. Nelson, manager of products control, U. S. Rubber Products Co., Inc., at Detroit.

Many of the members brought along their wives and families and a big family supper was held at the Golden Lion Inn, at San Diego, on the night preceding the excursion. On the day of the fishing trip the women of the party attended the San Diego Exposition at Balboa Park. Headquarters for the entire party were maintained at the Pickwick Hotel. Ed Royal, of H. M. Royal Co., Inc., Los Angeles, headed the committee in charge of all arrangements.

No meeting of any kind is scheduled for the month of August, the first Fall meeting of the Group being planned for the first Tuesday in October.

BRITISH TIRE EXPORTS SHOW 6.2% DECLINE

As compared with the corresponding period of 1935, British tire exports in the first six months of the current year declined 6.2%, while a 16.4% decline was noted in comparison with the first six months of 1934, according to the Bureau of Foreign and Domestic Commerce. The total exports of pneumatic tires for 1934, 1935 and 1936, respectively, being 698,753, 622,883 and 584,045.

Comparing British tire exports in this period with those in the same period of the preceding year, it is noted that exports to British territories suffered a loss of 8.4 per cent, while the trade loss in exports to foreign countries was but 4 per cent. The largest loss—95.2 per cent—was registered in exports to the Irish Free State, which may be accounted for by the beginning of operations of a tire manufacturing plant in that country.

Exports to New Zealand also declined —15.5 per cent— and the explanation may be increased tire exports to New Zealand from Australia. Analysis of British tire exports to foreign countries in the same two periods shows loss of trade with Belgium, 36.6 per cent, and with Spain 74.4 per cent—again the activities of local tire-manufacturing plants.

Another serious loss in British tire exports was registered in the trade with Italy, only four tires being exported to Italy in the first 6 months of 1936 as compared with 3,256 in the same period of 1935.

"BLOCK ISLAND" GROUP CAPTURES SWORDFISH!

The "Block Island" Group and proof of its "meeting"

The self-termed "Block Island" Group of the Rubber Division, A.C.S., consisting of a large group of rubber executives whose enthusiasm for deep sea fishing is second only to their business interests (although rumor holds it otherwise), held its ninth annual meeting at Block Island, off the Rhode Island coast, on August 1 and 2. Meetings were held at the Eureka barracks and on board the good ship *Harold C.*

According to report, many interesting "papers" were presented, but these were not made available to the industry-at-large. One such "paper", which is said to have aroused considerable favorable comment, was that delivered by Dr. "Izaak Walton" Herron on "Medicine as Applied to Swordfishing."

At one of the many meetings held on the *Harold C.* the members decided it was high time to have a complete complement of officers, and therefore the following "officers" were selected by unanimous approval:

Dave Scott, commodore; Butch Hamister, vice-commodore; Bill Cisney, diver; Walter Geldard, feeder of the fishes; Dave Shirk, photographer; Stan Krall, harpoon bender; Bob Casey, keeper of the collar; Frank Ward, starboard bluefisher; Howard Andersen, port bluefisher; Jack Coe, sword curer; Ike Herron, chief pharmacist's mate; Curley Curtis, active surgeon; Gib Madge, naval constructor (absent on official duty); Duke Bridgwater, naval sun-worshipper; Roy Hanslick, sun-worshipper (ordinary); Bill Higgins, European representative (absent on assigned duty); Bruce Silver, chaplain; Lem Foutz, absent with leave; Cabby Bartle, A.W.O.L.; Jr. Scott, quartermaster; Fred Stevens, cabin boy; Speed Dodge, skipper; Harold Dodge, lookout; and Popeye, oiler.

Determined to live up to their respective "official" titles, the "officers" of the group captured a giant broad-bill swordfish, weighing approximately 300 pounds. This feat was doubly impressive, since the captured swordfish was one of only eight caught that day off Block Island by a fleet of about 50 boats. Unfortunately, the group failed to catch three sharks (one of which was wounded) and a marlin. Another meeting will be held in the near future.

Goodyear Granted Preliminary Injunction Curbing Labor Board from Holding Hearings

Action of Supreme Court of the District of Columbia Prevents the Board from Taking any Additional Steps Until the Fall—Akron Labor Showdown Drawing Closer

THE Goodyear Tire and Rubber Company's fight to prevent the National Labor Relations Board from holding a public hearing in Akron on the company's alleged "unfair labor practices" moved a step closer to victory on August 4th when Justice Jennings Bailey, of the District of Columbia Supreme Court, granted the company a preliminary injunction restraining the labor board from holding a scheduled hearing. The court's action prevents the board from taking any further steps until the Fall at which time Justice Bailey will hear Goodyear's plea for a permanent injunction restraining the Government agency from proceeding with its charges. It is likely that the hearing in the Fall will prove to be a Supreme Court test of the constitutionality of the labor board.

Justice Bailey's decision culminated a series of events during July between Goodyear and the labor board. The origination of the charges against the tire company occurred several months ago when the United Rubber Workers filed charges with the board against the Goodyear Industrial Assembly. Two months ago, Sherman H. Dalrymple, president of the union, as well as several other union officials and organizers, were beaten bodily and driven from Gadsden, Alabama, where they had gone to organize the workers in the Goodyear factory in that city.

Accused of "Encouragement"

The rubber union, immediately after this occurrence, amended its complaint to the labor relations board, which in turn issued a complaint against Goodyear alleging that the company "encouraged and acquiesced in" the Gadsden attacks and that it dominated and financed the Industrial Assembly. This complaint, issued on July 11, by Ralph A. Lind, regional labor relations director at Cleveland, set a hearing on the charges for July 21 at the Summit County Courthouse.

The complaint also alleged that Goodyear has encouraged the formation and development of the Stahl-Mate Club, formed since the five-week strike at Goodyear several months ago, which, according to the labor board, "exists for the avowed purpose of disrupting membership of the United Rubber Workers." A long list of other "unfair labor practices" were included in the complaint.

On July 16, Goodyear filed an action in the District Court in the District of Columbia challenging the constitutionality of the National Labor Relations Act and requested a writ to enjoin the labor board from proceeding against it under the complaint. Goodyear charged that the citation made by the board was "unfair and unwarranted" and amounted to a repetition of the propaganda issued by the more intemperate union spokesmen in their campaign to force an enlarged membership. The constitutionality of the Act was challenged on several grounds. On the following day, July 17, District Supreme Court Justice Oscar R. Luhring issued a temporary restraining order against the labor board preventing the hearing scheduled for July 21 at Akron.

Approximately two weeks later, the National Labor Relations Board asked the District of Columbia Supreme Court to deny the injunction plea (filed by Goodyear a few days after it had secured the temporary restraining order from Justice Luhring) contending that under the labor relations law a court of equity does not possess jurisdiction in these disputes because the law states that a company when cited must seek relief in the appeals courts.

The board contradicted Goodyear's defense that it was not responsible for the Gadsden attacks and stressed the point that issuance of an injunction would seriously hamper the accomplishment of "important governmental ends." Despite this plea, Justice Bailey granted Goodyear a preliminary injunction restraining the board from holding a public hearing.

Disturbances Continue

Despite the banning of unauthorized sit-downs by both the Goodyear and Goodrich locals, which constantly disrupted production in both factories last month, especially at Goodyear, these occurrences are being continued. Feeling is flaming high at Goodyear, with such incidents as non-union workers being forced to leave the plants, violence in and out of the factory, extended sit-downs, and other acts, taking place almost daily. Goodyear's success in its battle with the National Labor Relations Board has only served to increase the bitterness of union workers throughout the factory. Union workers, it is charged, attempted to break up a parade held by the Stahl-Mate Club last month which preceded a picnic, although union officials denied the charge.

The rubber workers union has allied its interests with that of the Committee for Industrial Organization headed by John L. Lewis, an organization formerly associated through individual industrial unions with the American Federation of Labor, and which has been outlawed by that body. The C.I.O. favors industrial rather than craft unionization.

The Goodyear local of the United Rubber Workers, last month became the first rubber union to start a drive under the C.I.O.'s banner and is seeking to form one union for all types of Goodyear workers including office employes. The C.I.O. has also undertaken the organization of Goodyear workers at the Gadsden plant, replacing U.R.W. organizers.

Showdown Drawing Near

Unless Akron labor groups change their tactics, it is inevitable that a showdown take place in the near future, with a major strike involving most of the large rubber factories in Akron taking place. Rubber manufacturers have been forced to grant one concession after another to the unions, including a pay rise last May when tire prices were raised, in view of the fact that the season was at its height and each sit-down and labor disturbance proved costly to the managements.

However, peak activity in the tire industry will be over in the next few weeks, the tire makers have stepped up production in plants outside of Akron and have stored huge inventories in leading cities, Goodyear, as an example, having taken over an eight-story warehouse in Detroit so that shipments of original tires may be continued despite difficulties at Akron.

Since hours and wages are reputedly not the cause of the disturbances, it remains only to place the blame for the continuous labor bickerings on two factors, i.e., seniority rights and the determined effort of the rubber unions to increase membership to a point where there can be no argument as to workers' representation. Since each strike, minor or major, swells the ranks of the union, the charge of the rubber companies that radical organizers are highly responsible for the present disturbances seems to be borne out.

Gillette Expands Factory

Two additions to the factory of the Gillette Rubber Company, at Eau Claire, Wisconsin, are under construction. One is a second story addition to the tire building, 600 x 200 feet, the other being a 50 x 130 foot addition to the plant housing the mixers and mills. Gillette is currently operating on a 24-hour a day basis.

Goodrich Adds Three Tires

Three new high pressure tires have been added to the line of Super-Traction truck tires featured by the B. F. Goodrich Company, of Akron. Two of the new sizes take 75 pounds pressure, the other taking 80 pounds. Deeper treads feature these new truck tires.

Names in the News

W. E. CROFUT, president, Forest City Rubber Company, Cleveland, sailed for England on August 5 where he intends to establish a factory at Nottingham and arrange for the foreign distribution of the company's products. Forest City maintains plants in Cleveland, Mansfield and Toronto, Canada.

PAUL S. KELLER, connected with the rubber toy industry for more than 20 years, has been placed in charge of the molded ball department of the Seamless Rubber Company, New Haven, Conn. His headquarters will be at 475 Fifth Avenue, in New York City.

E. R. PRESTON, manager, commercial sales division, tire department, Goodyear Tire and Rubber Company, Akron, was presented with a 25-year service pin on July 30.

ALBERT THOMAS FELLOWS has joined the research staff of the Barrett Company, at Edgewater, N. J. He was formerly associated with the research divisions of the Union Carbide and Carbon Company and the Socony-Vacuum Oil Company.

DR. RICHARD R. VOGT, a member of the University of Notre Dame faculty since 1916, has been named to succeed the late REV. JULIUS A. NIEUWLAND as director of organic research at the university. He was associated with FATHER NIEUWLAND in the study of the chemistry of acetylene which led to the development of synthetic rubber.

EVAN J. EVANS, said to be the dean of all rubber calender men from the standpoint of active continuous service, has retired and was placed on the pension pay roll of the B. F. Goodrich Company last month. He started with Goodrich in 1891.

GEORGE R. VILA, associated with the Boston Woven Hose and Rubber Company for several years, has joined the sales department of the Naugatuck Chemical Division of U. S. Rubber Products, Inc., working out of the New York office. He will cover the Metropolitan New York territory.

A. F. RUCKS, associated with the C. J. Tagliabue Mfg. Company, of Brooklyn, N. Y., for more than 23 years, has been promoted to the position of general manager of that company. W. C. BENNETT and E. D. WACKER have been appointed general sales managers of the Eastern and Western territories, respectively.

E. T. CAMPBELL, formerly of the associated lines division of the B. F. Goodrich Company, Akron, has been named assistant manager of the Goodrich petroleum sales department.

WARREN F. BUSSE

Dr. Warren F. Busse, recently appointed Manager, Physical Research Laboratory, B. F. Goodrich Company, Akron, succeeding the late Dr. E. O. Dieterich, has been with the company since 1928. Born in Chicago on December 2, 1900, Dr. Busse attended Lawrence College and the University of Wisconsin, receiving his degree from the latter in 1923 and his Ph. D. four years later. After being graduated he worked for one year in the U. S. Forest Products Laboratory; acted as research associate at Wisconsin in 1927-28; and joined Goodrich as a physicist in the latter half of 1928. While at Wisconsin, Dr. Busse specialized in research in physics and chemistry. During the 1927-28 period he was a Charles A. Coffin Fellow. Residing at 575 Letchworth Avenue, in Akron, he is a member of Phi Beta Kappa, Phi Kappa Tau, the American Chemical Society and the American Physical Society.

E. E. PARDEE has been appointed vice-president and general manager of the South American plant of the Firestone Tire and Rubber Company, located at Buenos Aires. He has been with Firestone for many years, at one time acting as assistant export manager at the Akron plant.

F. G. ARNOLD, chief chemist, Rapid Roller Company, Chicago, returned from a 10-week tour of Europe late last month on the *City of Norfolk*, docking at Baltimore, Maryland.

WILLIAM F. KELLEY, president, Kelley Rubber Company, Akron, sailed on the *U. S. S. Berengaria* for England and Ireland on July 23 for a combination business-pleasure trip. He planned to appoint a distributor in England.

O'NEIL, OF GENERAL, URGES NEW MARKETS

Vigorously attacking the "absurd theory" that it is wise economy to "create less and even destroy certain kinds of wealth we now possess," William O'Neil, president of the General Tire and Rubber Company, Akron, in an address before the Sales Executives' Club of New York, at the Roosevelt Hotel in New York City, on July 27, stressed the point that "we should not create less but we should find new markets and new uses for more and better goods."

Pointing out that the idea of creating less takes salesmen definitely out of the picture, Mr. O'Neil defended industrial salesmen and cited several examples of the importance of the field force in promoting more and better business. "The market for the highest quality goods in any line will never become saturated as long as real salesmen will find and create new uses for the products they sell instead of merely taking orders for existing business," he said.

Using the tire industry as an example of one in which products are being consistently improved, the General Tire executive stated: "The tire industry is only forty years old, yet tires are being constantly changed and improved. While it is true that good tires today will deliver 30,000 miles of use as compared to 3,500 miles or less only a few years ago, too much stress has been placed on that increased mileage. That should be taken for granted today.

"The first tires were almost as hard as steel, so highly were they inflated, but ever since then the development of better tires has been a steady progress to lower air pressures and softer cushioning in the tires.

"Today's tires make today's motoring conditions possible. One could not drive safely today on wet, slippery pavements, at 60 miles an hour unless he had tires that would grip the pavement and stop the car, if need be, straight in its tracks and quickly. With such tires, such driving is not only possible but common."

CLYDE G. GAULT, formerly general manager of the Wooster Rubber Company, Wooster Ohio, is suing that company for $3,520 which he alleges is due him for back salary. A hearing was scheduled to be heard on August 3.

F. S. CONOVER, formerly with Rubatex Products, Inc., has joined the development department of the Naugatuck Chemical Division of U. S. Rubber Products, Inc., at Naugatuck, Conn. He has also been associated with Manhattan Rubber and New Jersey Zinc.

WILLARD D. EAKIN, recently resigned as assistant secretary and patent counsel of the B. F. Goodrich Company, has engaged in the general practice of patent and trade mark law, with offices in the Second National Building, in Akron. He had been with Goodrich for sixteen years.

Financial News

DIRECTORS APPROVE NEW GOODRICH SET-UP

Directors of the B. F. Goodrich Company, of Akron, meeting in New York City on July 21, approved a plan providing for the elimination of outstanding 7% cumulative preferred stock and accumulated dividends of approximately $35 a share through exchange for new preferred and common stock on the ratio of 1.4 shares of new cumulative preferred stock of no par value and one-half share of common stock for each present preferred share.

The new preferred stock would carry a $5 dividend rate which, for two years following approval of the plan (retroactive to July 1, 1936) would be payable in cash, in additional shares of the new preferred stock, or partly in each. A special stockholders' meeting has been called for September 9 at which action on this plan will be taken.

Accumulated Unpaid Dividends

At present, there are 294,308 shares of preferred 7% cumulative preferred shares outstanding, on which there is a total of $10,300,780 due in accumulated unpaid dividends. This entire issue is redeemable on three months' notice at $125 per share. The stock is currently quoted on the New York Stock Exchange at approximately $100 a share.

In a letter to stockholders explaining the recommended plan, David Goodrich, chairman of the board, pointed out that holders of the 7% preferred now outstanding would receive 1.4 shares of new preferred on which total dividends would amount to $7 a share, while the redemption price of the new 1.4 shares will be $140 per share plus any accrued and unpaid dividends. He stressed the point that the plan would also benefit holders of common stock since it will remove obstacles to the payment of dividends on such stock, and stated that after the consummation of the plan the owners of preferred shares would also own one-half as many shares of common stock as they now hold of preferred stock.

Six-Month Profit Reported

In announcing complete details of the proposed recapitalization, Goodrich also reported an estimated net profit of $2,650,000 for the six months ended June 30, 1936, equal to $1.40 a share on the common stock after allowing for preferred dividends. This compares with $1,553,040, or 45 cents a share, for the corresponding period in the previous year.

Goodrich has pending a refunding operation under which $28,000,000 of 4½% first mortgage bonds will be issued to retire $17,156,500 of first mortgage bonds and for expansion purposes. Stockholders approved this plan last year, but because certain stockholders, including Otis and Company, questioned the validity of the proxies obtained by the company in securing majority approval of the plan, Goodrich petitioned the New York courts for a legal ruling on the validity of the approval to avoid legal embarrassment once this program is launched. A decision on this score is expected in the near future.

The record date for stockholders entitled to vote on the proposed change of new preferred stock and common shares for the old preferred was set for July 31. Stockholders who did not possess stock in their own names by that date lost the right to vote on the new plan.

U. S. RUBBER REPORTS SIX-MONTHS EARNINGS

For the six months ended June 30, 1936, U. S. Rubber Company, and subsidiaries, reports a net income of $2,187,902, after depreciation, interest on funded indebtedness, provision for Federal and foreign income taxes, and other charges, which compares with a profit of $767,367 in the corresponding 1935 period.

Sales for the period amounted to $71,400,634, or 23.7% more than the $57,722,837 sales reported in the same period of the previous year. Profits from operations, after provision of $2,825,845 for depreciation, totaled $4,278,675. A total of $1,514,808 was provided for interest on the funded indebtedness, with $551,924 provided for income taxes. Included in the cost of operations is approximately $5,365,000 for excise, sales, social security, property and other taxes.

Although the board of directors, at a meeting held on July 1st, authorized distribution of common stock under the Managers Shares and B Bonus Plans of the company from earnings during 1935, the total authorized being $600,000, no provision for this distribution was made in the accounts for the first six months of 1936.

U. S. Rubber Plantations, Inc., had a profit of approximately $350,000, after provision for depreciation and amortization of $866,000, and other charges, but this profit was not included in the U. S. Rubber Company's income report. Profit for the period reduced the company's consolidated deficit to $23,784,929.

Flintkote Reports Profits

For the thirteen weeks ended on July 18, 1936, the Flintkote Company, and subsidiaries, reports a net profit of $1,156,246, equal to $1.72 a share after eliminating extraordinary income received in settlement of patent infringements and other claims. This compares with $1,172,386, or $1.60 a share, in the corresponding 1935 period. For the last seven weeks of the thirteen-week period, Flintkote realized a net profit of $471,399, or 70c a share after deductions.

CONVERSE RUBBER IN REFINANCING MOVE

In a letter to shareholders last month, the Converse Rubber Company, Malden, Mass., put forth plans for a voluntary reorganization under which preferred dividend accruals would be satisfactorily handled. Under the proposed plan, dividends would be resumed on the preferred stock as soon as these accruals are discharged, the accruals amounting to $12 a share, as of July 1.

On a share-for-share basis, the company proposes to exchange each old $33 par preferred stock for new $45 par voting preferred stock, a dividend of 50 cents a share to be paid to stock of record July 1 as soon as the plan is declared effective. The new stock will be entitled to $46.50 on liquidation and dividends paid at the rate of $2.00 a share annually, cumulative as from July 1. At present there are 17,744 of the $33 par shares outstanding on which net profit for the year ended March 28 was equal to $8.87 per share.

According to a ruling of the Converse board of directors, the proposed plan cannot be effective unless 90% of the holders of outstanding preferred stock assent. The period for exchange was designated to end September 15, 1936, but the time may be extended or the percentage requirement reduced if consented to by the parties concerned. The owner of the largest single block of Converse preferred, according to the letter to stockholders, has approved the plan, subject to approval by the stockholders.

Fisk Improves Position

Although reporting a net loss of $141,418 for the six months ended June 30, 1936, which compares with a net profit of $5,514, or 15 cents a share on the 6% preferred stock, the Fisk Rubber Corporation, Chicopee Falls, Mass., shows a net profit of $127,092 in the second quarter of the year. Net loss in the first quarter of the year amounted to $268,511. For the quarter ended June 30, 1935, Fisk reported a net loss of $37,231.

General Increasing Shares

Stockholders of the General Tire and Rubber Company, meeting at Akron on July 16, voted to authorize a change in the number of shares from 100,000 to 500,000 and to change the company's common stock from $25 to $5 per share. Common stockholders will receive five shares of the new stock for each share of the old. At the end of the last fiscal year, General had 87,145 shares of $25 par common stock outstanding.

Dayton Increases Profit

For the seven months ended May 31, 1936, the Dayton Rubber Manufacturing Company, and subsidiaries, report a net income of $166,917, equal to 72 cents a share on 156,245 common shares outstanding after preferred dividends. This compares with $46,624 earned in 1935.

OLYMPIC EXECUTIVES CONCLUDE LONG VISIT

Concluding a 5-month visit to the United States and England, Charles S. Butt, general manager, and Charles S. Grainger, factory manager and chief engineer, of the Olympic Tyre and Rubber Company, Ltd., Footscray (Melbourne), Australia, were scheduled to sail for their homeland on the S. S. Monterey, from Los Angeles, on August 19. The two Australian rubber executives left Australia early in April, crossed from Los Angeles to New York City visiting rubber factories, machinery houses and rubber supply plants en route, and sailed for England early in July on the Bremen, returning on the same boat to this country on July 21.

During a visit to the offices of THE RUBBER AGE, Mr. Butt expressed complete admiration for the United States and stated that he was amazed at the efficiency of our rubber, especially tire, factories. While in England, both executives visited several tire factories, cord fabric plants and rubber machinery manufacturers.

The Olympic Tyre and Rubber Company was organized in 1932, turned out its first tire in March, 1933, and swung into full production two or three months later. Devoted exclusively to tires, the company is producing approximately 800 tires per day, practically all of the machinery in the plant at Footscray having been built in Australia, including mills, mixers, calenders, etc.

The Olympic concern was organized by Frank Beaurepaire, one time famous swimming champion, whose enthusiasm for the Olympic sports was responsible for the name of the company. At the time he organized the company, Mr. Beaurepaire, who is president of the concern, was the largest distributor of new and retreaded tires in Australia. Most of the equipment was built on the specifications and under the direction of Mr. Grainger.

During his visit to these offices, Mr. Butt revealed that while the United States leads all nations in the number of automobiles owned based on its population, the equation being approximately 1 to every 4 people, New Zealand, with a population of only two million, ranks second with a rating of 1 to 7; Australia's rating is approximately 1 to 9. He stated that Olympic was confining its merchandising activities to Australia and New Zealand only, at present.

Reopen Guayule Plant

The Continental Mexican Rubber Company, a subsidiary of the Intercontinental Rubber Company, of New York City, has reopened its guayule plant at Cedras, Zacatacos, Mexico, which has a capacity of 190,000 pounds of dry rubber monthly, according to American Vice Consul C. P. English, stationed at Torreon. The Mexican company has been operating a guayule plant at Catorce, San Luis Patosi, since early in 1934. The reopened plant is expected to operate at near capacity.

100 Years Old!

The London (England) firm of P. B. Cow and Company, Ltd., has just celebrated its first 100 years of rubber manufacturing, the centenary being observed by an excursion attended by the company's 500 employes, directors and friends. In its early days the concern is said to have produced the first rubber sponge and the first seamless rubber glove used in surgical and domestic work. Present day products include gas masks, diving equipment, air beds for explorers and campers, and sundry articles.

SEEK TO STANDARDIZE RUBBER TEST METHODS

At the request of the Research Association of British Rubber Manufacturers, the British Standards Institution is currently circulating a draft standard for methods for the analysis and testing of latex and rubber. The proposal includes sections on analysis and testing of latex, methods of chemical analysis of rubber, methods of testing soft vulcanized rubber, and methods of testing hard rubber.

In preparing the suggested analytical methods, the Institution used as a basis the recommendations for testing recently published by the rubber research organization, which were compared with methods published by other British, American and Dutch standardizing authorities, composite tests being prepared.

Copies of the British proposal are available in this country from the American Standards Association, 29 West 39th Street, New York City.

Buy Detroit Storage Plant

The Goodyear Tire and Rubber Company purchased a permanent tire storage building in Detroit last month. An eight-story, brick and steel building, with a 205 foot frontage and an irregular depth up to 700 feet, the property was formerly used by the Hupp Motor Car Corporation for storing new cars preparatory to shipment to dealers. It is equipped with elevators and will be used by Goodyear for warehousing of automobile manufacturers' tire stocks.

Seiberling in New Bremen

By arrangement with the New Bremen (Ohio) Civic Association, the rubber glove department of the Seiberling Rubber Company, of Akron, will be removed to that city as soon as a former furniture factory in New Bremen is evacuated so that Seiberling may transfer its glove-making machinery. When ready, the new plant will employ approximately 75 people.

TIRE TRADE RULES APPROVED BY F.T.C.

Tentative approval of the trade practice rules for the tire industry, adopted at the tire trade conference held in Chicago last June, has been announced by the Federal Trade Commission to which body the rules and regulations were submitted immediately after the conference. The Commission is inviting further suggestions from the trade until August 18th after which date it will proceed toward final consideration of the regulations. If the regulations, which will be submitted to the entire industry for consideration, meet with the approval of a majority, then they become laws subject to legal enforcement.

Included among the rules laid down at the recent tire conference are those prohibiting anti-price discrimination contrary to the recently enacted Robinson-Patman Law; defamation of competitors; below-cost sales; false or deceptive brand marking; false advertising; sale of re-used tires without proper notification to prospective purchasers; secret rebates, refunds, commissions, etc.; misrepresentation of tires as to grade and quality; and others.

The original petitioner for the trade practice rules and regulations was the National Association of Independent Tire Dealers, which informed the F.T.C. that the industry numbers 50,000 independent dealers, 45,000 gasoline stations at which tires are sold, approximately 1,750 company-owned stores, 1,400 chain and mail order outlets, and approximately 50 tire manufacturers (the latter figure apparently including manufacturers whose products are manufactured by recognized tire manufacturers).

According to the Association, capital investment in the tire industry approximates two billion dollars, while the annual business volume reaches three-quarter of a billion dollars.

General at Dayton?

According to rumor, the General Tire and Rubber Company is giving considerable attention to Dayton as a site for its contemplated secondary plant. It is believed that several possible sites in Dayton have been offered to General including a few established factories. General officials have admitted that the company is seeking a site for another factory "preferably in the South."

Davol Sues Supply House

The Davol Rubber Company, Providence, R. I., has filed suit in the Southern District of New York against the Eagle Druggists Supply Company, Inc., of New York City, alleging that "Binky's Nursing Nipples" and "Binky's Bottle Caps" infringe the patented tab construction for caps and nipples for which Davol holds exclusive manufacturing and selling rights.

NEW ENGLAND NEWS

The Seamless Rubber Company, New Haven, Conn., is preparing to introduce its new stopperless, two-in-one water bottle and ice cap this fall through drug and department stores, according to J. Thomas Gibbons, sales manager. The new bottle features a patented closure which is guaranteed against leakage.

A wide opening makes possible the insertion of ice cubes up to one and three-quarter inches square and is also said to eliminate any danger from spouting steam when hot water is used. Heavy ribbing gives a radiator effect. The new combination bottle will be available in three colors—blue, green and red.

Contracts for CCC footwear recently awarded by the quartermaster's depot in Boston, Mass., include the following: United States Rubber Co., Naugatuck, Conn., 1,800 knee rubber boots at $1.94; Hood Rubber Co., Watertown, Mass., 700 pairs knee rubber boots at $1.99; Philips-Baker Rubber Co., Providence, R. I., 960 pairs hip rubber boots at $3.19; Tyer Rubber Co., Andover, Mass., 540 pairs hip rubber boots at $3.19; Goodyear Rubber Co., Middletown, Conn., 780 pairs hip rubber boots at $3.19; Endicott-Johnson Corp., Endicott, N. Y., 650 pairs hip rubber boots at $3.28; Converse Rubber Co., Malden, Mass., 700 pairs hip rubber boots at $3.29; Hood Rubber Co., 2,600 pairs hip rubber boots at $3.27; and United States Rubber Co., 7,720 pairs hip rubber boots at $3.33.

Sponge Rubber Products Company, Derby and Shelton, Conn., has awarded contracts for construction of an addition at its Derby factory, to be of brick and steel, 75 x 130 feet, with a flat roof and concrete floor.

The Paragon Rubber Company and American Character Doll Company, affiliated concerns, have started operations in Easthampton, Mass., employing about 60 hands and preparing to add more. The two units have been operating one shift, but it is planned to run three shifts in the Paragon division this fall.

United States Rubber Products, Inc., Naugatuck, Conn., resumed full operation in July after the annual shutdown of two weeks for inventory, machinery overhauling and vacation. Unofficial reports indicate that the company's Naugatuck plants will enjoy good production volume during the fall season.

Farrel-Birmingham Company, Inc., Ansonia, Conn., has awarded contracts for construction of a new storage building and a steel trestle. The new building will be 200 x 60 feet and the trestle will be 500 feet long.

Col. Charles E. Speaks, newly-elected president of the Fisk Rubber Corp., who came to Chicopee after 23 years with the Firestone Tire & Rubber Company, and Charles E. Maynard, factory manager, were principal speakers at the third annual outing of the Fisk Social and Athletic Association, held July 18 at Couture's Grove, Hampton Ponds, Mass. More than 700 attended.

Employee recreational activities at the Fisk plant continue unabated this summer. Following the Social and Athletic group's field day, the Fisk local of the United Rubber Workers of America was scheduled to hold its annual clambake on August 15 at Karl's Grove in Ludlow.

Two of the three largest taxpayers in Chicopee, Mass., are rubber companies. Fisk Rubber Corp. heads the list with an annual bill of $114,468, while ranking third is the A. G. Spalding Company with $48,549.

TRENTON NEWS

The annual outing of the Thermoid Company, Trenton, was held on July 11 at the Flemington (N.J.) Fair Grounds and was largely attended by employes and their families all of whom were taken from the plant in Trenton to the grounds in buses. Salesmen and sales managers from all parts of the United States, who were attending a four-day conference at the company's offices, also attended the outing which was featured by games and sports of all kinds. During the sales conference, preceding the outing, a banquet was held at the Stacy-Trent Hotel, in Trenton.

Operations have been resumed at the plant of the Lambertville Rubber Company, Lambertville. The plant has been closed down for a few weeks to take inventory and make necessary repairs.

The Richmond Tire Company, Trenton, has been awarded a contract by the N. J. State Purchasing Department to furnish pneumatic tires at a cost of $35,000. The Overman Cushion Tire Company, Belleville, received a contract to supply $4,000 worth of solid tires.

During the recent heat wave, the Pierce-Roberts Rubber Company was the only plant in the Trenton area forced to close down for several days.

The Continental Rubber Works, Erie, Pennsylvania, has instituted suit in the Federal Court of New Jersey against the Richardson Company, of New Brunswick, an Ohio corporation. The suit involves patent rights in rubber molding.

RUBBER SHIPMENTS INCREASE SHARPLY

Shipments of crude rubber from producing countries participating in the restriction scheme increased sharply during the month of June, amounting to 62,796 tons, representing a 12½% increase over the preceding month, according to the monthly statistics compiled by the International Rubber Regulation Committee. Total shipments in May amounted to 55,858 tons.

Although June shipments were higher than those recorded during any other month this year, and were 3,000 tons above the permissible quota, total exports from the participating countries for the first six months of the current year were kept within permissible shipments, amounting to 350,250 tons as compared with a permissible total of 357,520 tons. During the first six months of 1935 shipments from these same countries totaled 387,967 tons.

Effective with the month of July, the permissible monthly tonnage under the restriction scheme has been raised to 65,759 tons.

Ford to Make Tires?

The report that the Ford Motor Company will produce its own automobile, truck and tractor tires is again receiving credence in tire manufacturing circles. This report has cropped up innumerable times in the past but has always been found to have no actual basis. It is understood, however, that representatives of several tire machinery manufacturers were recently called in at the Dearborn plant. Ford is said to purchase about 20% of all original equipment tires sold, approximately half of his business going to Firestone, while Goodyear and Goodrich furnish about 35% of the balance, the remainder going to one or two smaller companies.

Twemo Appeals Decision

The Twemo Corporation and Walter L. Fairchild filed an appeal on July 30 in the U. S. Circuit Court of Appeals, at Cincinnati, against the ruling handed down by the U. S. District Court, at Cleveland, in their suits against the Goodyear Tire and Rubber Company and the National Rubber Machinery Company. The suit involves alleged infringement of the Fairchild patents on tube molds, the machine cited as infringing upon these patents having been built and installed by the National Rubber Machinery Co. After hearings before a referee, Judge Paul Jones, of Cleveland, dismissed the plea and assessed costs against the plaintiffs. The suit was originally filed in 1929.

Demolish Old Revere Plant

All but two of the fifty old buildings of the Revere Rubber Company at Chelsea, Mass., are being demolished. The factory was closed several years ago when U. S. Rubber moved to Providence, Revere being a subsidiary.

LOS ANGELES NEWS

A mechanical device which spreads a thin coat of latex on the under side of rug mattings has been perfected by Kirk Hill of the Kirkhill Rubber Company. The feature of the process lies in the spreading of a coating as thin as 1/3000 of an inch without penetration. A large revolving, chromium-plated cylinder contacts latex in a tank, heated to approximately 80°F., and picks up a minimum amount of latex due to its highly polished surface. The ribbon of matting, in bolts, under slight tension, contacts the cylinder at the top picking up the latex from the cylinder's surface.

The matting then passes between a series of steam heated rollers which dry it quickly before the latex can penetrate. The labor cost is said to average .006c per yard. Material treated in this manner will not slip on the floor and, due to the backing, can be beaten and refluffed as needed. It is also said to roll more easily and lends itself to quicker handling.

The Oriental Rubber Company, located at 1346 East Slauson Avenue, has been sold by T. J. Barker to Karl W. Faulhaber. This company specializes on rubber floor tile sold under the trade name of "Faulco". Mr. Barker, who has been in business for twelve years, is retiring from business. Mr. Faulhaber comes from Seattle where he has been acting as Northwest representative in Washington, Oregon, Idaho and Montana, for the factory he has now purchased. He held the Northwest position for four years.

The factory is being improved, new machinery installed and the trade territory generally enlarged under the new set-up. Branch offices have been established at Salt Lake City, Great Falls, and Portland (Ore.). Jas. Irving has been put in charge of the Salt Lake City office, E. W. Bunnell in charge of the office at Great Falls, and M. Balfour at Portland. The sales force has been increased approximately 25 per cent.

Products other than floor tile manufactured by this company are non-skid typewriter pads, dental and barber mats, and rubber runners and matting.

E. J. Savage, purchasing agent for the tire division of U. S. Rubber Products, Inc., spent the last week of July in Los Angeles coming from Seattle where he had attended the national Shrine convention. Mr. Savage, whose home is at Detroit, Mich., was accompanied by his wife and daughter.

The mid-summer golf tournament of the Los Angeles Group, Rubber Division, A.C.S., was held at the Montebello Golf Club on Saturday, July 11. The cup was won by James W. Stull of the Santa Fe Rubber Mills, Los Angeles. The first blind bogy prize, a set of leather club head gloves, was won by Earl Brooks of the California Golf Products Company. The second blind bogy was won by Bert Dougherty, of the B. E. Dougherty Company of Los Angeles, the prize being a mechanical golf score recorder.

Plans are being formulated for a large Fall tournament but no definite date has yet been decided upon. The committee in charge consists of H. H. Hummer of the Firestone Tire and Rubber Company and M. Montgomery of the Martin Hoyte Milne Company.

Two fires, affecting members of the rubber industry, occurred last month. The Western Sulphur Company suffered a $28,000 loss in a fire at its San Pedro (California) sulphur refining plant on August 3rd, the blaze starting from an electric spark generated by the material as it was passing through one of the refining machines. An elevator plant, valued at $5,000, and 850 tons of powdered sulphur were destroyed.

Fire caused by the spontaneous combustion of fine rubber dust from a tire buffing machine in the retreading department of the "Y" Tire and Sales Service Company caused a $4,000 loss. This is reported to be the first fire resulting from this cause in the immediate Los Angeles area.

Describes Foreign Cooperatives

Returning from a six-month tour of Europe, Stanley W. Caywood, general sales manager, International Division, B. F. Goodrich Company, termed the cooperative merchandising purchase plans of the Scandinavian countries, particularly Sweden, as "unbeatable competition to tires sold there by Akron manufacturers." The cooperatives, as they are termed, are matching the quality of American tires with their own brands and underselling them by 15 to 18%, according to Mr. Caywood. The cooperatives, he explained, erect factories to produce their own products, these products being sold at cost plus 5%, the plus percentage providing all of the capital needed to finance operations. Discussing general conditions abroad, Mr. Caywood stated that most nations of the Continent and the Far East are rapidly emerging from business lassitude.

Preparing Oaks Plant

Preparations are being made by the B. F. Goodrich Company to reopen its rubber reclaiming plant at Oaks, Pennsylvania, for the purpose of installing tire building machinery. Currently being reconditioned, the plant is expected to begin operations sometime in the Fall, with 350 employes and a daily output of approximately 400 tires. The Oaks plant was closed down in 1932.

LOS ANGELES PLANTS STEP UP PRODUCTION

The total imports of crude rubber coming into Los Angeles harbor during the first six months of 1936 equalled 74% in tonnage and 83.5% in value of harbor receipts for the entire year of 1935. This indicates a large expansion in tire production in Los Angeles, now the second city in the nation in tire output. The opening of the new Studebaker plant last November, followed in May by the opening of the General Motors assembly plant, unquestionably increased demand for locally made tires.

During 1935 the four major tire plants in Los Angeles, Goodyear, U. S. Rubber, Goodrich and Firestone, manufactured products valued at $37,311,000. The cost of materials, containers, fuel, and purchased power was $19,334,000; wages paid amounted to $4,872,000; and the wage earners numbered approximately 3,600. If the probable increase of 40% or more for this year is realized as predicted, then a record may be set.

All four major tire plants have installed, or are about to install, additional equipment making possible a 40% increase in tire output tonnage. All tire plants have been running at capacity for some months.

Some of the reasons for full time production as cited are as follows: (1) increased new motor car market necessitated by long delayed replacement needs; (2) the tendency of the automobile industry to decentralize as evidenced by recent establishment of at least four automobile plants here and the increased output of these plants; and (3) the larger supplies of new tires required as original equipment on the eleven lines of passenger and commercial cars being assembled in Los Angeles in 1936.

A survey made by the Los Angeles Chamber of Commerce indicates that the renewal market for cars on the Pacific coast has held up better on the average than in the country as a whole. New cars purchased in California, Oregon and Washington during the first six months of 1936 exceeded the first half of 1935 by 49,282, or by 37.2%. It is noted that an increasing percentage of the cars sold in these three states are being assembled in Los Angeles assembly plants with a consequent boost to local tire production.

Enlarging Office Space

A contract has been let for additional space at the factory of the Dayton Rubber Manufacturing Company, at Dayton, Ohio. The addition will be 160 x 40 feet, the total contract calling for an expenditure of $15,000.

Everlastik Appoints Vamos

Alfred Vamos, of the Marbridge Building, New York City, well-known designer in the shoe industry, has been appointed exclusive distributor of the Everlastik line of Lastex shoe fabrics, by Everlastik, Inc., of Chelsea, Mass.

Obituaries

John M. Alderfer

John M. Alderfer, founder and for many years president of the India Tire and Rubber Company, died at the age of 69 at his home in Sharon Center, Ohio, on July 10. He had been in ill health

for several years. Born in Western Star, Ohio, Mr. Alderfer lived in Sharon Center for most of his life, residing in Akron for business reasons for a few years. After receiving his education in the public schools, he entered the lumber business during which period he invented a wooden crate which was widely used in shipping tires.

In 1916, shortly after a fire had destroyed his lumber plant, he organized the India Tire and Rubber Company in association with Paul Searles, and others, and erected a factory at Mogadore. In its early days the Mogadore plant produced 100 tires a day. From the inception of the company until 1928 Mr. Alderfer served as president, relinquishing that post in the latter year to become chairman of the board of directors, a position he held until his retirement from all business participation in 1932.

During his stay in Akron, he was prominent in the civic life of the city, being especially active in the affairs of the Y. M. C. A. and the First Methodist Church. He was equally as active in the civic affairs of Sharon Center. Funeral services were held at the Sharon Center residence on July 13 with interment at Wadsworth, Ohio. He leaves a widow, a son, a daughter, a brother and two sisters.

George D. White, 2nd

George D. White, 2nd, manager of the retail stores of the United States Rubber Products, Inc., died at his home in Scarsdale, New York, on July 20, at the age of 44. Death was attributed to a sudden heart attack. Born in Newark, N. J., Mr. White matriculated at the Rutgers Preparatory School and was graduated from Pennsylvania State College in 1915. During the war he served overseas as a sergeant in the U. S. Army Medical Corps. Prior to joining U. S. Rubber in 1932, he had been president of the White and McKenna Firestone Service Stores, Inc. A Mason, Mr. White was also a member of Delta Upsilon and the New York Athletic Club. Funeral services were held on July 23 with interment in Rosehill Cemetery, Linden, N. J. He is survived by a widow, son and father.

H. O. Phillips

H. O. Phillips, president of the Stedman Rubber Flooring Company, South Braintree, and the Appleton Rubber Company, Franklin, both in Massachusetts, died at the age of 78 from an attack of angina pectoris, on July 13. Born in Providence, Mr. Phillips was educated in the public schools and entered the employ of a wire manufacturing company at an early age.

In 1885, in conjunction with his brother, the late Edgar B. Phillips, he organized E. B. Phillips and Company, at Central Falls (R. I.), the predecessor of the Phillips Wire Company, of Pawtucket, which was absorbed by the General Cable Company in 1925. After severing his connection with the company he founded, where he served as treasurer, Mr. Phillips became a heavy stockholder in the Stedman and Appleton companies, becoming president of both concerns shortly thereafter.

During his career he also served as president of the Davis-Jones Insulated Wire Company, Taunton Rubber Company and the Pettingwell-Andrews Company. He also held financial interests in the Crown Manufacturing, Collyer Insulated Wire and Royal Weaving companies. Besides his business interests, Mr. Phillips served as a director of the Rhode Island Hospital Trust Company, and was a member of the Turks Head, Martha's Vineyard Country and the To Kalon clubs.

Funeral services were held on July 16 with interment in the Swan Point Cemetery, Pawtucket. He leaves the second Mrs. Phillips (divorced last year), three daughters, two sisters and a brother.

Hubbard D. Nitchie, Sr.

Hubbard D. Nitchie, Sr., who was continuously employed in the sales and engineering department of the Watson-Stillman Company, of Roselle, N. J., since his graduation from Cornell University in 1897, with the exception of a few years, died suddenly at his home in Cranford, N. J., on August 2.

JUNE CONSUMPTION WAS 4.3% ABOVE MAY

Consumption of crude rubber by manufacturers in the United States for the month of June is estimated to be 52,636 long tons, which compares with 50,482 long tons for May. June consumption shows an increase of approximately 4.3% over May, and 45.6% above June a year ago, according to statistics released by the Rubber Manufacturers Association. Consumption for June, 1935, was 36,156 (revised) long tons.

Imports of crude rubber for June are reported to be 41,802 long tons, an increase of 17.4% over the May figure of 35,600 long tons, and 9% above the 38,340 long tons imported in June, 1935.

Total domestic stocks of crude rubber on hand June 30, were estimated at 245,886 long tons, which compares with May 31 stocks of 248,317 long tons and 324,218 (revised) long tons on hand June 30, 1935.

Crude rubber afloat to U. S. ports as of June 30 is estimated to be 47,228 long tons as compared with 48,860 long tons afloat on May 31 and 55,581 long tons afloat on June 30 a year ago.

June reclaimed rubber consumption is estimated at 11,548 long tons; production, 11,935 long tons; and stocks on hand, June 30, 22,738 long tons.

MAY TIRE SHIPMENTS SHOW 19% INCREASE

Shipments of pneumatic casings during the month of May are estimated to be 5,831,964 units, an increase of 19% above April and 43.4% above shipments made in May, 1935, according to statistics released by the Rubber Manufacturers Association.

Production of pneumatic casings for May was estimated to be 4,970,993 casings, an increase of 2.4% over April and 19.1% above May, 1935.

Pneumatic casings in the hands of manufacturers on May 31, 1936, are estimated to be 8,176,296 units, a decrease of 9.5% under the stocks on hand April 30, and 26.5% below stocks on hand May 31, 1935.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	*Production*	*Inventory*
May, 1936	5,831,964	4,970,993	8,176,296
April, 1936	4,902,721	4,854,133	9,034,017
May, 1935	4,067,386	4,175,170	11,130,765
May, 1934	5,331,694	4,456,224	11,126,567

U. S. Adds New Products

A new line of automotive accessories, featuring several new products, is being introduced by U. S. Rubber Products, Inc. The new products include an hydraulic brake fluid which has an operating range from 250° F. above zero to 40° F. below zero; a white rubber tire coating, described as a compound solution of rubber and white pigment which is self-vulcanizing; auto body cleaner; auto top sealer; radiator solder; and others. U. S. Rubber has also launched a new packaging program.

New Rubber Goods

Rubber Steel Wool Holder

Under the trade name of Red Devil, a molded rubber steel wool holder has been perfected by the firm of Landon P. Smith, Inc., Irvington, N. J. The wool

is easily inserted in the rubber holder by simply bending up the sides and clamping in the wool, the holder, when released, forming an effective clamp. Although designed specially for the Handy Size Steel wool roll, featured by the company, it can be used with any reasonably sized piece of steel wool. The rubber holder protects the hands of the user.

All-Rubber Laundry Net

An all-rubber laundry net which has several times the service life of cotton nets has been developed by U. S. Rubber Products, Inc. Special openings are provided at the top of the nets for closing with the conventional pin prior to the washing operation. Use of the rubber net prevents tangling of clothes in the net or of the net in the wheels, even when the wash wheel is rotated in one direction. Tests have proven that tensile losses from frictional wear are practically eliminated. One of many advantages claimed for the rubber net is that the washing of nets is entirely avoided, offering the possibility of greater laundry pay loads. Another important advantage lies in the fact that when a rubber net does fail it merely tears between two perforations so that it does not dump out the contents.

Bobzy Rubber Shade Stop

A rubber device for use in connection with window shades is being merchandised by G. Hirsch Sons, Inc., 119 West 40th Street, New York City, under the name of the Bobzy Shade Stop. By means of a screw attachment, the device is inserted at the bottom of the shade through the eyelet ordinarily supplied for a cord pull, the latter being removed and inserted in an eyelet provided in the shade stop. Use of this device prevents shade unwinding, stops "runaway" shades, prolongs their life, prevents the shade from rattling or blowing when windows are open from top, etc. It is designed for shades hung about one inch or less from the top of window frames.

Lee-Tex Space Torpedo

A novel toy weapon, known as the Buck Rogers Space Torpedo, is being merchandised by the Lee-Tex Rubber Products Company, 904 Blackhawk Street, Chicago. It is made of heavy

fibre and rubber, a tough rubber cup being used to provide the necessary force to shoot wooden "torpedoes" that are tipped with rubber suction cups.

Invalid Bed Receptor

A new type of invalid bed receptor is being manufactured by U. S. Rubber Products, Inc., for Mrs. B. I. C. Young, a Pasadena (Calif.) nurse who has had the item patented. The receptor is made of soft texture sheet rubber and is similar in shape to a bed pan. A roll of absorbent cotton is placed around the inner perimeter of the appliance and a few sheets of the same material is laid on its floor. The receptor is attached to the bed-ridden patient with two strips of adhesive tape. Occasional applica-

tions of talcum powder prevent irritation or discomfort of any kind. The receptor is said to be proving popular with physicians and hospital attendants.

Darex Latex Pail

A new type acid-proof, non-breakable pail made of latex has been developed by the Dewey and Almy Chemical Company, Cambridge, Mass.

Merchandised under the trade name of the Darex Latex Pail, it is reinforced by rubber ribs so that it holds its full quota of liquid without appreciable bulging, according to the manufacturer, the front side also being reinforced with a double thick wall for a six-inch width, permitting easy pouring when the pail is resting on the edge of a tank or platform, without collapsing the bucket. A specially designed spout permits control of the size of the stream poured. Hundreds of these pails are already in use, particularly in hospitals and institutions because of their quiet, non-marking properties.

Cushioned Shoes

The use of sponge rubber cushioning in men's shoes is increasing with two prominent shoe manufacturers featuring lines of shoes equipped with these cushions. The Portage Shoe Mfg. Company, of Milwaukee, is merchandising the Porto-Pedic Air Cushioned Shoe, while the Rohn Shoe Manufacturing Company, also of Milwaukee, is featuring the Rohn Nu-Matic Nailless Cushioned Shoes, both of these lines making use of sponge rubber cushions which are said to retain their resiliency throughout the life of the shoes.

Schaar Latex Tubing

For laboratory and general use, Schaar & Company, of Chicago, is featuring latex tubing made without the addition of fillers, colors or extraneous matter other than the necessary curing agents. The specific gravity is 0.93, with a very low free sulfur content. It is said to adhere firmly to glass or metal tubing, and connections made with it will not leak or slip. The resistance of this latex tubing to aging is claimed to be about 300% greater than acid cured and 50% greater than steam cured tubing.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, AUGUST 10, 1936

Crude Rubber

CRUDE rubber prices have been apathetic since our last report, swinging in a 45 point range, from a high of 16.70 for spot on the Commodity Exchange on July 9 to a 16.25 low on August 5. This apathy is attributed, for the most part, to unsettled labor conditions in Akron, combined with the belief that domestic consumption will fall off this month due to the passing of peak production and closing of factories for vacation periods and taking of inventory. There is a strong suspicion in market circles that the recent record-breaking consumption was not "honest" consumption, but rather represented the stepped-up production of finished products to build up inventories in preparation for labor difficulties. Although tire production is high, inventories are lower, this being explained by the fact that manufacturers are shipping respectable amounts to dealers on consignment. The price for spot is expected to continue declining slowly for the next several weeks. Quotations in the outside market, Exchange, London and Singapore, follow:

As of August 10

Plantations—			
Ribbed Smoked Sheets—			
No. 1 Spot	—	@	.16⅛
October-December	—	@	.16 7/16
January-March	—	@	.16 5/16
No. 2	—	@	.16¼
No. 3	—	@	.16 3/16
No. 4	—	@	.16⅛
Thin Latex Crepe	—	@	.16⅛
Thick Latex Crepe	—	@	.16⅛
Brown Crepe, No. 1	—	@	.16¼
Brown Crepe, No. 2	—	@	.16
Amber Crepe, No. 2	—	@	.16¼
Amber Crepe, No. 3	—	@	.16 3/16
Amber Crepe, No. 4	—	@	.16 1/16
Brown Crepe, Rolled	—	@	.15⅛
Latex—			
Liquid Latex, per gal.	.61	@	—
Paras—			
Up-River, fine	—	@	.20½
Acre Bolivian, fine	—	@	.21
Balata—			
Block, Ciudad	—	@	.32

LONDON MARKET

Standard Smoked Sheets—Buyers—August 10

August	—	@	7 5/16d
October-December	—	@	7 5/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—August 10

August	—	@	7 3/16d
October-December	—	@	7 3/16d

Reclaimed Rubber

Reclaimers report continued activity with the usual Summer lull completely avoided. With both the automotive and building industries sustaining their pace, they look forward to increased business in the early Fall. The high price of crude rubber adds to their optimism. There have been no changes in prices since our previous report. Current quotations follow:

High Tensile			
Super-reclaim, black	lb.	.08¾ @	.09
High Tensile Red	lb.	.07¾ @	.08
Shoe			
Unwashed	lb.	.06½ @	.06¾
Washed	lb.	.08 @	.09
Tube			
No. 1 (Floating)	lb.	.14 @	.14¼
No. 2 (Compounded)	lb.	.07¼ @	.07½
Red tube	lb.	.07¾ @	.07¾
Tires			
Black	lb.	.05 @	.05¼
Black, selected tires	lb.	.05¼ @	.05½
Dark Gray	lb.	.06½ @	.06¾
White	lb.	.10 @	.10¼
Truck, Heavy Gravity	lb.	.05½ @	.06
Truck, Light Gravity	lb.	.06 @	.06¼
Miscellaneous			
Mechanical blends	lb.	.03½ @	.04½

Scrap Rubber

(Delivered Akron Mills)

There has been a slowing up of available scrap rubber stock recently, with dealers inclined to hold on to scrap. An early price rise is forecast in some quarters although it may not materialize. Prices have increased slightly on inner tube stocks, all grades. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	17.50	@19.00
Mixed auto	ton	9.00	@10.00
Beadless tires	ton	13.50	@15.00
Clean solid truck tires	ton	26.50	@28.00
Boots and shoes	ton	15.00	@17.50
Arctics, untrimmed	ton	10.00	@12.50
Inner tubes, No. 1	lb.	.09½ @	.10½
Inner tubes, No. 2	lb.	.04⅜ @	.04½
Inner tubes, Red	lb.	.04⅜ @	.04½

Cotton

Because of several unfavorable factors, including uncertainty over the Government's crop forecast, reports of more favorable crop progress throughout the country, heavy hedge selling based on Government released cotton, and others, cotton prices have declined steadily since our last report, dropping from a 13.65 quotation for spot on July 10 to a 12.32 price on August 10, a decline of 133 points. Prices dropped approximately $1.50 a bale in the initial response to the unexpectedly large Government crop forecast of 12,481,000 bales announced on August 8, the price for spot dropping from 12.63 on that date to 12.32, low figure for the period, on the following market day, August 10. Trade estimates had placed the forecast at slightly less than 12,000,000 bales. Although export orders have declined somewhat, domestic consumption continues well above a year ago, with no indications of any let-down in consumption for the balance of the year. Many mills report backlogs of unfilled orders. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	July 8	August 10		
	Close	High	Low	Close
October	12.48	11.79	11.63	11.67
December	12.45	11.80	11.66	11.71
March	....	11.89	11.75	11.81

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.29¾ @	.30½
Peeler, carded, 23/4/3	lb.	.30¾ @	.31¼
Peeler, carded, 15/3/3	lb.	.27¾ @	.28¼
Peeler, carded, 13/3/3	lb.	.26¾ @	.27¼
Egyptian, carded, 23/5/3	lb.	.44 @	.44½
Egyptian, combed, 23/5/3	lb.	.49 @	.49½
CHAFERS			
Carded, American, 1 1/16"	lb.	.31 @	.33
Carded, American, 1"	lb.	.28 @	.30½

Sheetings

48x40	36 in.	5.50	lb.	— @	.05¾
40x40	36 in.	6.15	lb.	— @	.04⅝
40x36	36 in.	6.50	lb.	— @	.04½
48x48	40 in.	2.50	lb.	— @	.09⅜
48x48	40 in.	2.85	lb.	— @	.08⅜
56x60	40 in.	3.60	lb.	— @	.08
48x44	40 in.	3.75	lb.	— @	.07⅝
44x40	40 in.	4.25	lb.	— @	.06½

Ducks

Enameling	lb.	.29 @	.33
Belting and Hose	lb.	.28 @	—
Single filling, A grade	lb.	.13½ @	.15½
Double filling	lb.	.16¼ @	—

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM JULY 9 TO AUGUST 7

Date	Spot	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Sales
July 9	16.63	16.57	16.61	16.66	16.69	16.73	16.77	16.79	16.82	16.85	16.89	16.93	16.97	....	151
10	16.70	16.65	16.68	16.71	16.74	16.77	16.81	16.84	16.87	16.90	16.95	17.00	17.05	....	104
11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
13	16.63	16.62	16.63	16.65	16.69	16.73	16.77	16.79	16.82	16.85	16.90	16.95	16.99	....	47
14	16.62	16.57	16.58	16.60	16.63	16.67	16.71	16.73	16.76	16.79	16.83	16.87	16.91	....	83
15	16.56	16.50	16.55	16.60	16.63	16.66	16.70	16.73	16.76	16.79	16.82	16.85	16.89	....	98
16	16.40	16.36	16.41	16.47	16.50	16.53	16.57	16.59	16.61	16.63	16.68	16.74	16.79	....	210
17	16.41	16.35	16.40	16.46	16.49	16.52	16.56	16.58	16.61	16.64	16.69	16.74	16.79	....	69
18	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
19	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
20	16.50	16.45	16.48	16.51	16.54	16.57	16.61	16.63	16.66	16.69	16.72	16.75	16.79	....	26
21	16.53	16.48	16.50	16.52	16.56	16.60	16.65	16.67	16.69	16.71	16.75	16.80	16.84	....	34
22	16.47	16.42	16.44	16.47	16.50	16.53	16.57	16.60	16.63	16.66	16.70	16.75	16.79	....	11
23	16.44	16.36	16.37	16.37	16.41	16.45	16.49	16.52	16.55	16.58	16.63	16.68	16.72	....	152
24	16.31	16.29	16.30	16.32	16.35	16.38	16.42	16.45	16.48	16.52	16.57	16.62	16.66	....	177
25	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
26	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
27	16.41	16.34	16.35	16.36	16.40	16.44	16.48	16.51	16.55	16.59	16.63	16.67	16.71	....	57
28	16.50	16.45	16.46	16.48	16.52	16.56	16.60	16.63	16.66	16.70	16.74	16.79	16.83	....	56
29	16.47	....	16.43	16.45	16.50	16.54	16.58	16.61	16.63	16.65	16.71	16.77	16.82	....	15
30	16.44	....	16.40	16.41	16.44	16.47	16.51	16.55	16.59	16.63	16.67	16.72	16.77	....	35
31	16.44	....	16.38	16.40	16.43	16.47	16.51	16.54	16.57	16.61	16.64	16.68	16.72	....	94
Aug. 1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...
3	16.44	....	16.42	16.42	16.43	16.48	16.53	16.56	16.58	16.60	16.63	16.67	16.71	16.75	42
4	16.38	....	16.32	16.32	16.35	16.37	16.39	16.43	16.46	16.50	16.54	16.58	16.62	16.66	149
5	16.25	....	16.24	16.24	16.27	16.31	16.35	16.38	16.41	16.44	16.47	16.51	16.55	16.59	119
6	16.31	....	16.29	16.29	16.32	16.36	16.40	16.43	16.46	16.49	16.53	16.58	16.62	16.66	54
7	16.34	....	16.31	16.31	16.34	16.38	16.42	16.45	16.48	16.51	16.56	16.62	16.66	16.70	37

Rubber CHEMICAL Markets

NEW YORK, AUGUST 10, 1936

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.24 @	.28
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-77	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.44 @	.47
Diphenylguanidine	lb.	.35 @	.37
El-Sixty	lb.	.55 @	.65
Ethylidene aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lead Oleate, No. 999	lb.	.11 @	—
Witco	lb.	.11 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	1.60 @	1.85
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.50 @	1.80
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.24 @	.28
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka B	lb.	.62 @	.75
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.06½ @	.07
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.37 @	.39
Ultramarine	lb.	.15 @	—
Browns			
Sienna, Italian	lb.	.06 @	'13
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome, light	lb.	.20 @	.30
medium	lb.	.21 @	.31
Chromium Oxide, bbl.	lb.	.19 @	.20
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/17	lb.	.48 @	—
sulfur, free	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone CB, No. 21	lb.	.06 @	.06¼
Cryptone, No. 19	lb.	.06 @	.06¼
Cryptone, ZS-20	lb.	.10½ @	.10¾
Cryptone, ZS-86	lb.	.10½ @	.10¾
Lithopone			
Albalith, black label—11	lb.	.04½ @	.04¾
Azolith	lb.	.04½ @	.04¾
Rayox	lb.		
Titanium oxide	lb.	.17 @	.18½
Titanox B	lb.	.06 @	.06¼
Titanox C	lb.	.06 @	.06¼
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.05 @	.05¼
ZZ (leaded)	lb.	.04⅞ @	.05¼
Anaconda, lead free	lb.	.05 @	.05¼
Horsehead Lead Free Brand:			
Special—3	lb.	.05 @	.05¼
XX Red—4	lb.	.05 @	.05¼
XX Red—72	lb.	.05 @	.05¼
XX Red—78		.05 @	.05¼
XX Red—103	lb.	.05 @	.05¼
U. S. P.—X, bbls.	lb.	.08 @	.08¼
Kadox, black label—15	lb.	.05 @	.05¼
Blue label—16	lb.	.05 @	.05¼
Red label—17	lb.	.05 @	.05¼
St. Joe, black label	lb.	.05 @	.05¼
green label	lb.	.05 @	.05¼
red label	lb.	.05 @	.05¼
Zinc Oxide—French Process			
Florence White seal—7 bbls.	lb.	— @	.06¾
Green seal—8	lb.	.06 @	.06¼
Red seal—9	lb.	.05½ @	.05¾
Yellows			
Chrome	lb.	.11 @	.12
Ocher, dom. med.	lb.	.02¾ @	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	13.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	61.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	23.65 @	31.15
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	70.00 @	75.00
Calcene	ton	37.50 @	45.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.40 @	60.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	8.50 @	10.00
Congaree	ton	9.00 @	—
Dixie	ton		
Dixie, Jr.	ton		
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.11 @	.15
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesium carbonate	lb.	.08 @	—
Mica	ton	35.00 @	—
Pyrax A	ton	— @	—
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	3.19 @	3.39
Talc, domestic	ton	16.00 @	18.00
Whiting, commercial	ton	17.00 @	18.00
Columbia Filler	ton	9.00 @	14.00
English Cliffstone	ton	33.00 @	43.00
Sussex	ton		
Witco	ton	7.00 @	—
Wood Flour	ton	18.00 @	30.00
Zinc Carbonate	lb.	.10½ @	.11
Zinc Stearate	lb.	.26 @	—

MINERAL RUBBER

Black Diamond	ton	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	31.00 @	—
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.45 @	2.70
glacial, USP, bbls.	100 lb.	14.00 @	—
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08½ @	.11¾
Stearic, double pressed	lb.	.10 @	.11
Stearite	lb.	.08 @	—
Alkalies			
Caustic Soda, 76%	cwt.	3.60 @	3.75
Soda Ash, 58% C.L.	cwt.	2.52 @	—

Oils			
Corn, refined, bbls.	lb.	.11½ @	.11¾
Cottonseed, crude	gal.	.093 @	.10
Cycline Oil	gal.	.15 @	.28
Degras, bbls.	lb.	.05¼ @	.06¾
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.05 @	—
Niger	lb.	.04¾ @	—
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.03½ @	.03¾
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
Pine, steam distilled	gal.	.64 @	.65
dest. dist., drums	gal.	.44 @	.46
Rosin Oil, cmpd.	gal.	.40 @	—
Rubtack	lb.	.40 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.05½ @	—
Witco Softener	gal.	.15 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.03½ @	—
coal tar	gal.	.07½ @	.08
hardwood	ton	15.00 @	—
pine, 200 lb. gr. wt.	bbl.	4.00 @	4.50
Rosin, grade K, 280 lb.	bbl.	5.90 @	—
Pigmentar, tank cars	gal.	.19 @	—
in drums	gal.	.25 @	.27
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	bbl.	12.00 @	13.00
Solvents			
Acetone, pure	lb.	.11 @	—
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.28 @	.39
Benzene, 90%	gal.	.18 @	.23
Beta-Trichlorethane	gal.	— @	—
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05¼ @	.08
Carbon, tetrachloride	lb.	.05¼ @	.06
Dichlorethylene	lb.	.29 @	—
Dipentene, cml., drums	gal.	.41 @	.44
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.31 @	—
Plastogen	lb.		
Reogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.09½
Turpentine, spirits	gal.	.50 @	—
dest. dist., drums	gal.	.47 @	—
Waxes			
Beeswax, white	lb.	.34 @	.35
Carnauba, yellow	lb.	.45 @	.46½
Ceresin, white, dom.	lb.	.08 @	.11
Montan, crude	lb.	.10¾ @	.11¾
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.03½ @	—
White crude scale 124/126	lb.	.03 @	—
Refined, 122/127	lb.	.04½ @	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H	lb.	.54 @	.65
Flectol White	lb.	.95 @	1.15
Flectol B	lb.	.54 @	.65
Neozone	lb.		
Oxynone	lb.	.66 @	.75
Perfectol	lb.	.67 @	.75
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Aresklene	lb.	— @	—
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Laurex	lb.	.24 @	.30
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08
Zip (Mold Wash)	lb.	— @	—

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.26 @	—
Black	lb.	.08½ @	—
White	lb.	.08½ @	.13
Brown	lb.	.08 @	.14
Duphax	lb.	.11 @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.03½ @	.04½
Sulfur flour.			
Refined, 100% pure (bags)	cwt.	2.55 @	3.15
Commercial (bags)	cwt.	1.60 @	2.35
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Re-exports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1934	449,322	97,898,519	9.73	23,848	5,770,109	11.23	425,615
1935	453,135	115,299,448	11.36	11,389	3,084,331	12.09	441,746
1934:							
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409
Oct.	28,318	8,203,447	12.93	2,058	620,754	13.46	26,260
Nov.	36,325	10,470,076	12.87	1,230	327,672	11.89	35,095
Dec.	17,590	4,974,374	12.62	866	240,780	12.46	16,724
1935:							
Jan.	39,675	10,852,308	12.21	977	278,229	12.72	38,698
Feb.	47,271	12,291,242	11.61	1,845	480,440	11.62	45,426
March	45,350	11,801,152	11.62	1,868	486,379	11.62	43,482
April	39,735	10,096,487	11.34	1,096	285,903	11.64	38,639
May	29,278	7,171,025	10.98	793	202,402	11.39	28,485
June	31,240	7,523,598	10.75	524	153,595	13.10	30,716
July	46,987	11,666,577	11.08	489	132,173	12.06	46,498
August	40,249	10,419,056	11.56	476	130,464	12.23	39,773
Sept.	34,659	8,637,048	11.12	468	120,438	11.48	34,191
Oct.	35,091	8,742,222	11.12	651	188,518	12.92	34,440
Nov.	25,050	6,137,160	10.94	380	101,793	11.95	24,670
Dec.	38,417	9,930,710	11.54	1,821	523,997	12.85	36,596
1936:							
Jan.	32,255	8,624,060	11.94	732	229,129	13.98	31,523
Feb.	32,879	9,293,711	12.62	625	199,956	14.27	32,254
Mar.*	33,447	9,845,776	13.14	1,172	390,551	14.88	32,275
Apr.*	44,218	13,967,712	14.10	984	343,785	15.59	43,234
May*	35,578	11,460,157	14.38	1,589	580,021	16.30	33,989
June	36,376	12,073,632	14.82	2,469	904,669	16.35	33,907

* Revised.
Note: Total 1935 figures (revised) subject to further revision.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1934	402	75,349	1,054	438,209	4,988	943,752	13,070	3,633,253
1935	468	86,835	626	188,384	5,747	1,063,126	13,553	3,782,222
1935:								
June	105	19,502	75	23,809	330	50,165	591	152,665
July	51	9,800	49	15,758	388	62,736	1,144	303,518
August	50	9,464	31	8,963	445	82,179	1,234	370,431
Sept.	18	3,245	29	6,090	1,682	407,418	1,048	291,652
Oct.	48	8,112	27	7,641	208	33,262	1,287	342,101
Nov.	70	11,931	39	11,706	269	50,657	1,023	261,668
Dec.	91	15,317	62	18,269	414	71,885	1,395	391,386
1936:								
Jan.	70	13,182	30	8,924	656	133,948	1,667	474,682
Feb.	75	14,127	100	34,389	396	84,635	1,459	406,985
Mar.	40	7,605	65	25,590	378	70,560	1,427	417,704
April	103	19,469	38	15,232	751	146,548	1,612	522,049
May	88	16,698	59	21,217	521	114,099	1,472	490,769
June	97	18,380	33	13,671	767	186,274	1,897	657,311

(1) Weight given in pounds of dry rubber contained in latex.
Note: Total 1935 figures (revised) subject to further revision.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)
(All Quantities in Long Tons)

	Figures on Monthly Basis: 1929	1930	1931	1932	1933	1934	1935	1936
Jan.	43,002	36,194	28,557	29,648	22,645*	39,190*	47,103	48,506
Feb.	41,594	33,302	28,797	31,821	21,392*	40,515*	43,187	36,746
Mar.	44,730	35,540	32,788	29,505	17,483*	47,003*	42,620	42,703
Apr.	47,521	39,686	33,321	27,518	25,928	44,853*	44,247*	51,897
May	49,233	39,386	37,817	30,957	44,074	42,918*	41,101*	50,482
June	43,227	34,195	37,916	41,475	50,743*	40,147*	36,156*	52,636
July	41,526	29,508	31,397	29,976	49,614*	32,553*	36,384	
Aug.	38,274	30,850	27,586	23,721	44,428*	33,216*	39,242	
Sept.	34,707	25,515	23,638	23,847	35,281*	30,258*	37,553	
Oct.	34,800	27,516	22,277	22,286	31,543*	31,253*	42,436	
Nov.	27,659	23,691	22,943	23,231	28,831*	34,748*	42,778	
Dec.	25,531	21,687	21,409	18,015	28,757*	36,569*	42,942	
Tot.	469,804	375,980	348,986	332,000	400,719*	453,223*	495,749*	

* Revised.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,000	1935	122,948	112,712	22.7	25,069

	Figures on Monthly Basis: Production	Consumption: Tons	Consumption: % to Crude	Stocks*		Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1935:									
Jan.	10,465	11,261	23.9	22,291	July	8,421	8,396	23.1	17,810
Feb.	10,072	9,374	23.3	22,989	Aug.	9,557	8,795	22.4	18,272
Mar.	10,549	9,741	22.9	20,637	Sept.	9,041	8,764	23.4	18,260
Apr.	10,315	10,466	23.4	18,716	Oct.	11,926	9,662	22.8	19,640
May	10,223	9,938	23.9	18,541	Nov.	11,482	9,084	21.2	21,478
June	8,590	8,710	23.8	17,932	Dec.	12,307	8,521	19.8	25,069
1936:									
Jan.	11,665	10,039	20.7	26,145	July	.....	.....	...	.....
Feb.	10,188	7,366	20.1	28,267	Aug.	.....	.....	...	.....
Mar.	10,712	8,767	20.5	29,161	Sept.	.....	.....	...	.....
April	11,382	10,333	19.9	22,274	Oct.	.....	.....	...	.....
May	11,512	10,396	20.6	22,852	Nov.	.....	.....	...	.....
June	11,935	11,548	21.9	22,738	Dec.	.....	.....	...	.....

* Stocks on hand at the end of month or year.
a Revised.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1934*	1935*	1936		1934*	1935*	1936
January	29,489	28,062	32,553	August	39,105	42,836	
February ...	25,310	26,432	27,401	September ..	34,669	37,862	
March	30,577	31,997	35,871	October ...	37,674	41,401	
April	32,736	36,082	38,825	November ..	34,998	35,956	
May	38,071	39,095	42,007	December ..	30,581	33,734	
June	36,430	37,890	44,630				
July	37,466	41,209		Total ...	467,106	432,556	

* Revised on basis of final annual figures issued by Bureau of Mines.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	18,664,356

1936:		1936:		1936:	
January ...	1,877,448	May	1,959,425	September..	.....
February ..	1,260,590	June	1,876,446	October ...	.....
March	1,840,723	July	1,716,463	November ..	.....
April	2,258,296	August	.....	December ..	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1934																																
April		11¼	11⅜	11⅝	11⅝	11⅝	11⅝	—	11⅜	11¾	11¾	11⅞	—	12⅛	—	12⅞	13⅛	12⅞	12⅜	12⅜	12⅜	—	12⅜	12⅝	12⅝	12⅜	12⅜	12⅛	—	13⅝	—	12⅜
May		14⅝	14⅞	15	15⅛	15⅛	15⅛	15¼	14	13⅞	13¾	13⅞	13⅞	13⅞	13⅝	13⅝	13⅝	13⅛	13	13	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	12	12¾	12¾	—	13¼
June		13	—	12¾	—	13¼	13¼	13¾	13⅛	13⅛	13⅛	13⅛	13⅜	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	14	14⅛	14⅛	—	13⅝
July		14	—	14⅜	—	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅛	14⅛	—	14⅜
August		14⅛	15	—	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	—	15⅜
September		14⅜	—	15⅜	15⅛	15⅛	15⅛	15⅜	14	13⅞	14⅜	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15	14⅞	14⅞	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15	14⅛	14	13	14—	13
October		14½	13⅞	14	13⅜	13⅜	13⅜	13⅜	13¾	13⅜	13⅜	—	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	14	14	14	14	14⅛	14⅛	14⅛	13⅞	13⅞	13⅞	13⅞	13⅜	13⅜	13⅜	—
November		13⅝	13	13	13	—	—	13⅜	13⅜	13⅜	—	—	13⅜	12⅞	13⅛	12⅞	13	13	13	13	13	12½	12⅜	12⅜	—	13⅛	13⅛	12⅞	12⅞	—	—	—	—
December		13⅝	12⅞	—	—	—	—	—	—	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	—
1935																																
January		13⅝	13⅝	13½	13½	13½	13⅜	13⅜	13⅜	13⅜	13⅜	—	13¼	12⅞	—	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛
February		13⅜	—	12¾	12¾	12¾	12¾	13⅛	13⅛	—	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜
March		13	—	12¾	12¾	12½	12⅝	12	12	—	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜
April		11⅜	11⅞	11⅞	11	11	10⅛	10⅛	10⅛	—	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜
May		11⅛	11⅞	11½	—	11⅛	11⅛	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜
June		12⅛	12⅛	12½	—	12½	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜
July		12⅛	12¼	—	12¼	12¼	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛
August		12⅛	12¼	—	11⅞	11⅞	11⅞	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
September		11⅞	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝
October		11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜
November		13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜
December		13⅜	—	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜
1936																																
January		13½	—	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	—	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14½	14½	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜
February		15⅞	—	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	—	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞	15⅞
March		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
April		15⅛	—	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	—	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛
May		15⅜	—	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	—	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
June		15⅝	—	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	—	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝
July		16⅛	—	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	—	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Aug.		16⅞	—	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	—	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞	16⅞

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1930

	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents
Jan.	15.24	8.34	4.38	3.08	9.32	13.10	14.35
Feb.	15.85	7.70	4.03	2.95	10.45	12.92	15.48
Mar.	15.34	7.71	3.35	3.01	11.01	11.51	15.89
Apr.	14.93	6.43	3.02	3.56	12.10	11.55	15.98
May	14.24	6.49	3.09	4.95	13.26	12.05	15.62
June	12.45	6.35	2.66	6.15	13.51	12.57	15.85
July	11.24	6.37	2.89	8.01	14.60	12.10	16.49
Aug.	9.96	5.38	3.63	7.31	15.47	11.98	
Sept.	8.28	5.08	3.84	7.30	15.36	11.55	
Oct.	8.20	4.87	3.65	7.64	13.96	12.62	
Nov.	9.01	4.65	3.44	8.66	13.04	13.15	
Dec.	9.05	4.64	3.24	8.87	12.98	13.28	
Average for Year	11.98	6.17	3.49	5.96	12.92	12.37	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1936 May	1936 June	1936 July	1936 Aug.	Day	1936 May	1936 June	1936 July	1936 Aug.
1	7 7/16	—	7 7/8	—	17	—	7 7/8	7 11/16	
2	7 1/2	7 1/4	7 11/16	—	18	7 3/8	7 7/8	—	
3	—	7 1/4	7 11/16	—	19	7 5/8	7 7/8	—	
4	7 3/8	7 7/8	—	7 5/8	20	7 7/8	—	7 11/16	
5	7 3/8	7 1/4	—	7 7/8	21	7 7/8	—	7 11/16	
6	7 3/8	7 1/4	7 3/4	7 7/8	22	7 7/8	7 3/8	7 11/16	
7	7 1/4	—	7 3/4	7 5/8	23	7 3/8	7 7/8	7 5/8	
8	7 1/4	7 3/8	7 3/4	—	24	—	7 1/2	7 5/8	
9	7 1/4	7 7/8	7 3/4	—	25	7 3/8	7 1/2	—	
10	—	7 7/8	7 3/4	7 7/8	26	7 7/8	7 1/2	—	
11	7 1/4	7 7/8	—		27	7 1/4	—	7 5/8	
12	7 1/4	7 3/8	—		28	7 7/8	—	7 11/16	
13	7 1/4	—	7 3/8		29	7 7/8	7 7/8	7 11/16	
14	7 3/8	—	7 11/16		30	—	7 7/8	7 11/16	
15	7 3/8	7 7/8	7 3/4		31	—	—	7 11/16	
16	7 7/8	7 7/8	7 11/16						

Average Monthly Price Per Pound

Month	1933 Pence	1934 Pence	1935 Pence	1936 Pence	Month	1933 Pence	1934 Pence	1935 Pence	1936 Pence
Jan.	2.264	4.429	6.434	6.758	Aug.	3.811	7.401	5.696	
Feb.	2.093	4.920	6.292	7.255	Sept.	3.728	7.409	5.508	
Mar.	2.099	5.136	5.745	7.450	Oct.	3.957	6.806	6.130	
Apr.	2.323	5.712	5.604	7.502	Nov.	4.096	6.294	6.308	
May	2.966	6.207	5.822	7.335	Dec.	4.200	6.295	6.340	
June	3.392	6.245	6.027	7.352	Average for Year	3.233	6.159	5.976	
July	3.860	7.053	5.801	7.696					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1936 June	1936 July	1936 Aug.	Date	1936 June	1936 July	1936 Aug.	Date	1936 June	1936 July	1936 Aug.
1	11.79	12.50	12.89	11	11.79	13.59		22	12.41	13.14	
2	11.80	12.51	—	12	11.80	—		23	12.23	13.12	
3	11.80	12.49	12.83	13	11.80	13.52		24	12.16	13.16	
4	11.77	—	12.63	14	—	13.50		25	12.26	13.30	
5	11.80	—	12.59	15	11.79	13.43		26	12.43	—	
6	11.78	12.62	12.65	16	11.85	13.40		27	12.49	13.23	
7	—	12.69	12.67	17	11.98	13.23		28	—	13.10	
8	11.78	13.23	12.63	18	12.00	13.12		29	12.39	12.80	
9	11.79	13.28	—	19	12.23	—		30	12.33	12.84	
10	11.79	13.65	12.32	20	12.32	13.27		31	—	12.85	
				21	—	13.31					

Average Monthly Price Per Pound

	1933 Cents	1934 Cents	1935 Cents	1936 Cents		1933 Cents	1934 Cents	1935 Cents	1936 Cents
Jan.	6.23	11.25	12.70	11.91	Aug.	9.55	13.40	11.48	
Feb.	6.05	12.28	12.58	11.53	Sept.	9.64	13.00	10.80	
Mar.	6.39	12.30	11.63	11.43	Oct.	9.58	12.48	11.28	
Apr.	7.02	11.80	11.73	11.71	Nov.	10.04	12.53	12.01	
May	8.64	11.44	12.25	11.68	Dec.	10.17	12.76	11.99	
June	9.47	12.20	11.89	12.02	Average for Year	8.63	12.36	11.88	
July	10.76	12.84	12.26	13.11					

World Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1934	ON HAND 1935	ON HAND 1936	AFLOAT 1934	AFLOAT 1935	AFLOAT 1936	ON HAND AND AFLOAT 1934	ON HAND AND AFLOAT 1935	ON HAND AND AFLOAT 1936
Jan.	370,039	349,446	285,054*	45,768	42,066	43,870	415,807	391,512	328,924*
Feb.	358,423	340,264	282,902*	53,063	42,969	46,532	411,486	383,233	329,434*
Mar.	353,078	340,284	276,823*	54,722	44,485	58,935	407,800	384,769	335,758*
Apr.	351,073	337,586	264,228*	56,251	37,651	47,678	407,324	375,237	311,906*
May	350,935	322,558	248,317	57,921	44,375	48,860	408,856	366,933	297,177
June	358,461	324,218	245,886	46,698	55,581	47,228	405,159	379,799	293,114
July	365,072	334,692		45,869	49,018		410,941	383,710	
Aug.	363,711	334,106		40,278	47,724		403,989	381,830	
Sept.	360,623	331,121		38,831	43,413		399,454	374,534	
Oct.	362,571	322,857		38,247	49,913		400,818	371,770	
Nov.	362,826	308,993		38,625	46,588		401,451	355,581	
Dec.	355,000	303,000		47,644	39,094		402,644	342,094	

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

Note: Complete figures for 1934 and 1935 were revised by the R.M.A. on May 1, 1936.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1934	London 1935	London 1936	Liverpool 1934	Liverpool 1935	Liverpool 1936
January	38,570	81,807	84,791	51,702	66,405	77,188
February	38,752	87,605	79,757	52,730	67,983	77,138
March	40,501	92,664	74,779	53,813	69,218	72,823
April	42,413	94,361	68,932	53,695	70,584	71,388
May	42,190	95,722	61,349	54,007	71,927	69,150
June	45,674	98,077	55,993	54,028	73,131	66,173
July	50,490	99,226		55,414	74,915	
August	48,953	101,574		56,246	75,584	
September	56,103	101,198		56,848	76,263	
October	63,079	94,749		57,818	76,400	
November	67,656	90,542		60,106	76,301	
December	72,285	86,551		62,505	77,589	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

At end of 1935	Penang and Singapore [1]	Malaya [2]	Ceylon [2]	Holland	Para and Manaos
August	46,482	34,541	4,866	1,455	4,571
September	33,872	33,489	4,403	1,442	4,673
October	37,597	34,271	3,790	1,440	4,346
November	32,597	34,197	4,393	1,550	4,062
December	28,304	33,899*	4,794	1,553	4,683
At end of 1936					
January	31,195	35,231*	4,504*	1,568	4,496
February	38,421	34,109	4,475	1,532	6,199
March	29,322	31,723	3,866	1,547	4,864
April	32,200	34,090	3,123	1,497	4,873
May	26,687	33,179	3,381	1,360	4,522

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

End of: 1935	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
June	55,581	27,485	17,934	101,000
July	49,018	29,150	17,832	96,000
August	47,724	32,800	21,476	102,000
September	43,413	31,090	26,497	101,000
October	49,913	29,000	20,087	99,000
November	46,588	26,250	16,162	89,000
December	39,094	25,200	18,706	83,000
End of 1936:				
January	43,870	20,160	19,970	84,000
February	46,532	18,690	19,778	85,000
March	58,935	16,820	14,245	90,000
April	47,678	17,025	18,297	83,000
May	48,860	18,670	21,470	89,000
June	47,228	18,000 P	22,772	88,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.
P—Preliminary estimate.

TOTAL WORLD STOCKS

(Figures from the Survey of Current Business)

At end of	1931	1932	1933	1934	1935	1936
January	$10,296	638,416	634,797	661,948	698,153	600,479*
February	$16,123	626,819	626,227	663,308	686,195	599,355*
March	$32,080	629,894	638,428	666,382	678,809	574,594*
April	$31,832	630,803	629,159	658,796	677,006	558,583
May	$28,855	627,474	626,537	689,239	677,569	532,411
June	$33,021	595,712	613,055	672,804	671,525	
July	$48,794	589,037	618,258	676,200	679,061	
August	$55,931	597,274	617,449	674,702	680,644	
September	$61,838	599,986	623,683	694,361	661,509	
October	$88,873	609,368	636,597	680,616	655,000	
November	605,684	614,342	642,968	684,408	623,300	
December	628,826	629,898	654,890	705,975	611,987*	
Monthly Average	553,513	615,752	630,171	677,395	666,729*	

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1928	1929	1930	1931	1932	1933	1934	1935
Production	77,944	68,726	50,965	48,739	40,085	45,304	47,233	49,362
Shipments	74,296	69,395	53,638	48,151	40,260	44,094	46,687	50,357
Inventory [2]	13,624	11,838	9,003	7,775	7,644	8,888	9,455	8,196

Figures for Recent Months

	PRODUCTION 1934	PRODUCTION 1935	PRODUCTION 1936	SHIPMENTS 1934	SHIPMENTS 1935	SHIPMENTS 1936	INVENTORY 1934	INVENTORY 1935	INVENTORY 1936
Jan.	3,922	4,626	4,579	3,222	3,663	3,875	9,684	10,398	8,918
Feb.	4,335	4,383	3,577	3,285	3,287	3,211	10,725	11,530	9,265
Mar.	5,180	4,346	3,638	4,223	4,204	3,856	11,651	11,675	9,087
Apr.	4,470	4,512	4,854	4,438	5,144	4,903	11,981	11,003	9,034
May	4,456	4,175	4,971	5,332	4,067	5,832	11,127	11,131	8,176
June	4,342	3,910		5,228	4,262		10,219	10,755	
July	3,353	3,532		4,157	5,447		9,437	8,850	
Aug.	3,533	3,993		4,308	4,739		8,697	7,805	
Sept.	2,936	3,787		3,183	3,303		8,419	8,288	
Oct.	3,287	4,051		3,010	4,095		8,657	8,291	
Nov.	3,341	3,997		3,191	3,990		8,779	8,249	
Dec.	3,778	4,051		3,109	4,154		9,455	8,196	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1928	1929	1930	1931	1932	1933	1934	1935
Production	80,180	68,829	52,420	48,333	36,891	42,546	46,228	47,879
Shipments	77,127	70,592	54,938	50,021	37,911	41,391	45,046	48,241
Inventory [2]	16,117	12,807	9,999	7,922	6,749	7,815	9,180	8,231

Figures for Recent Months

	PRODUCTION 1934	PRODUCTION 1935	PRODUCTION 1936	SHIPMENTS 1934	SHIPMENTS 1935	SHIPMENTS 1936	INVENTORY 1934	INVENTORY 1935	INVENTORY 1936
Jan.	3,530	4,259	4,734	3,199	3,722	4,297	8,403	9,621	8,889
Feb.	4,077	4,171	3,666	3,323	3,362	3,552	8,445	10,466	8,968
Mar.	5,194	4,123	3,904	4,118	4,168	3,913	10,244	10,406	8,960
Apr.	4,735	4,259	4,973	4,342	4,453	4,893	10,585	10,170	9,060
May	4,359	3,892	4,968	4,902	3,451	5,071	10,043	10,615	8,989
June	4,097	3,480		5,309	4,024		8,795	10,050	
July	3,531	3,251		4,323	5,269		8,053	8,005	
Aug.	3,680	3,894		4,198	4,556		7,555	6,939	
Sept.	3,110	4,125		3,024	3,426		7,639	7,565	
Oct.	3,219	4,435		2,689	4,110*		8,151	8,053	
Nov.	3,169	3,942		2,767	3,801*		8,503	8,161	
Dec.	3,503	4,048		2,850	4,084*		9,180	8,231	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.
(2) Held by manufacturers at end of period indicated.
(*) Revised.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	4,009,496	3,285,836	723,660	172,995	139,742	33,253	4,182,491
1935 [1]							
June	361,248	296,609	64,639	15,745	12,276	3,469	376,993
July	336,985	276,084	60,901	13,069	9,471	3,598	350,054
Aug.	239,994	182,389	57,605	7,692	5,524	2,168	247,686
Sept.	89,804	57,285	32,519	5,323	3,819	1,504	95,127
Oct.	275,024	214,609	60,415	8,313	7,128	1,185	283,337
Nov.	398,039	338,425	59,614	13,496	12,042	1,454	411,535
Dec.	407,804	344,613	63,191	13,775	11,370	2,405	421,579
1936							
Jan.*	364,004	298,274	65,730	13,302	11,261	2,041	377,306
Feb.*	287,606	224,816	62,790	13,268	10,853	2,415	300,874
March*	420,971	343,523	77,448	17,974	14,488	3,486	438,945
April	502,775	417,133	85,642	24,951	20,247	4,704	527,726
May	460,565	385,507	75,058	20,006	16,389	3,617	480,571
June	454,487	376,641	77,846	16,400	13,126	3,274	470,887

* Revised.
[1] Figures for the complete period of 1935 were revised by the Bureau of the Census, Department of Commerce, on January 24, 1936.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								DUTCH EAST INDIES [4]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [5]	Siam [6]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,522	176,705	413,817	53,584	13,134	20,850	8,868	28,051	57,479	78,362	135,247	29,949	11,125	5,055	856,245
1934:															
May	69,403	25,691	43,712	8,870	1,106	1,892	1,397	997	12,104	14,606	26,598	1,243	726	328	113,579
June	53,282	20,981	32,301	5,397	1,425	1,886	644	1,497	4,860	6,192	15,956	1,593	765	377	72,893
July	53,335	22,829	30,506	3,818	710	1,662	1,048	2,399	5,762	7,369	14,415	1,703	353	252	69,997
Aug.	52,641	17,865	34,776	4,948	552	1,714	1,048	1,908	5,340	8,901	11,356	1,610	710	251	73,114
Sept.	61,051	17,889	43,162	6,555	294	1,438	839	1,626	5,722	10,738	14,688	1,665	764	222	87,713
Oct.	47,045	10,226	36,819	6,544	413	1,412	1,196	1,328	5,970	6,643	5,556	1,413	840	401	68,535
Nov.	51,140	8,759	42,381	6,756	501	953	941	1,356	7,621	7,123	5,338	2,356	1,017	334	76,676
Dec.	59,575	15,375	44,200	8,481	990	1,237	680	2,043	10,865	12,953	12,354	2,956	1,035	239	98,033
1935															
Jan.	56,720	17,142	39,578	5,202	2,269	1,630	1,222	2,614	3,812	5,371	8,704	2,650	1,196	460	74,719
Feb.	50,593	17,676	32,917	5,556	731	1,887	760	2,288	4,395	7,663	15,194	2,076	636	254	74,154
Mar.	47,407	13,437	33,970	3,181	701	1,901	773	2,076	5,592	7,950	7,973	1,472	740	526	66,855
Apr.	53,360	16,029	37,331	2,976	370	1,895	846	1,661	5,574	6,873	12,683	2,827	963	185	74,957
May	51,353	23,720	27,633	4,223	674	2,323	848	2,752	6,217	7,931	21,058	2,138	832	315	76,920
June	49,751	18,637	31,114	3,525	1,077	2,031	603	2,869	5,698	8,258	14,168	2,021	659	393	72,416
July	48,975	11,257	37,718	4,106	580	1,870	1,164	1,939	5,899	5,664	8,373	2,015	427	407	70,162
Aug.	51,873	10,978	40,895	5,683	724	759	566	2,062	4,661	6,923	8,875	2,451	1,150	442	74,541
Sept.	51,247	10,418	40,829	3,970	681	1,797	421	2,278	4,089	5,862	9,422	2,248	1,017	493	73,107
Oct.	48,258	19,364	28,894	5,932	1,198	2,168	1,040	2,622	3,937	6,698	16,432	2,748	1,240	462	73,371
Nov.	43,147	10,518	32,629	4,288	1,806	1,356	455	2,155	3,724	3,963	8,511	2,392	936	587	62,802
Dec.	37,838	7,529	30,309	4,942	2,323	1,233	171	2,735	3,881	5,206	3,854	4,911	1,329	531	61,425
1936:															
Jan.	39,101	12,582	26,519	4,131	1,293	2,317	938	1,665	4,315	6,347	9,270	2,449	1,606	613	61,463
Feb.	38,436	18,857	19,579	3,664	1,382	2,111	529	3,663	4,789	6,643	15,479	2,892	1,201	832	62,764
Mar.	46,552	12,026	34,526	4,336	1,324	1,848	342	2,966	4,484	5,052	8,949	2,553	1,264	586	68,230
Apr.	35,999	14,698	21,301	3,172	1,255	2,053	869	1,596	4,895	6,446	12,612	2,417	1,056	693	58,365
May	46,568	12,527	34,041	2,560	1,115	2,354	517	2,293	4,258	6,015	10,743	2,340	956	700	67,892
June	40,049	15,026	25,023	3,780	1,253	1,386	461	3,737	4,577	6,519	14,370	2,733	943	700	65,482

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: THE FIGURES FOR 1933 ARE REVISED AS OF JANUARY 25, 1935 AND REPRESENT FINAL FIGURES

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	73	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,883	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880		9,978	7,593	4,068	11,878	8,140	11,245	
1934:															
Nov.	35,982	15,875	3,176	3,425	1,568	5,580	1,764	4,488	516	379	187	1,382	542	215	75,079
Dec.	17,305	15,816	3,605	5,207	2,849	3,904	1,979	6,460	1,312	—168	139	1,143	615	762	60,928
1935															
Jan.	39,546	20,383	5,573	4,286	2,670	4,400	1,613	3,446	1,099	419	158	1,252	468	1,245	86,558
Feb.	45,999	15,609	4,593	3,513	1,558	5,582	4,356	1,810	848	399	477	838	567	1,836	87,985
Mar.	44,772	12,810	4,017	6,353	2,710	4,421	1,582	4,624	1,459	240	331	891	630	741	85,581
Apr.	40,061	11,574	3,306	5,820	1,063	6,635	1,653	3,387	1,150	520	329	1,049	432	789	78,115
May	29,962	12,498	3,828	6,049	3,929	5,429	935	1,937	671	982	272	853	815	774	68,934
June	31,410	10,253	3,210	4,551	1,435	3,373	1,831	3,087	496	1,065	446	780	745	604	66,286
July	47,694	9,454	3,247	4,929	1,319	4,484	1,298	1,823	520	572	157	800	548	185	77,030
Aug.	41,057	14,120	4,508	4,790	2,814	4,453	916	1,227	655	528	413	820	752	673	77,726
Sept.	35,256	11,223	3,740	5,453	1,604	3,590	1,696	1,593	449	806	282	1,030	793	914	68,429
Oct.	35,770	3,184	5,175	6,074	812	4,727	2,500*	4,876	829	539	671	1,000	597	742	67,496
Nov.	25,756	2,942	4,731	6,258	4,389	4,361	2,000*	4,858	783	449	245	1,206	1,044	1,276	60,298
Dec.	38,072	4,779	5,522	4,823	2,567	6,112	2,500*		1,019	1,074	287	1,359	750	1,466	
1936:															
Jan.	33,260	4,573	6,755	5,545	1,759	4,355	1,500*	467	1,260	760	369	736	664	767	62,770
Feb.	33,789	1,271	6,264	5,257	1,900	2,786	1,000*	94	735	799	106	497	1,312	344	56,154
Mar.	33,743	—1,227	4,333	4,569	1,811	5,170	1,000*	4,376	819	1,033	339	754	1,113	410	58,243
Apr.	44,948	2,097	4,250	5,497	1,079	4,929	1,000*		919	1,097	238	848	679	603	
May	35,549	302	4,335	4,639	2,221	5,531	1,000*		1,034	698	103	657		667	
June	35,901	—1,493	4,846	5,698		4,567					—37				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

ADVERTISING PAGES REMOVED

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Chemicals and Compounding Materials

ACCELERATORS—
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-32, Z-88, A-510, DPG
ANTIOXIDANTS — Flectol A. Oxynone
MONSANTO CHEMICAL CO.
Rubber Service Laboratories Div.
1012 Second National Bldg., Akron, Ohio

AERO BRAND
RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York, N. Y.

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 25 years.*
The Aluminum Flake Co.
Akron, Ohio

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CALCENE—The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
The Columbia Alkali Corporation
BARBERTON, OHIO

CARBON BLACK—*Micronex*
the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

RATES
for Listings in this Section

\$5.00 per listing per month.
10% Discount if 2 listings per month are used.
15% Discount for 3 or more listings per month.
Copy Subject to Style Regulations.
No cuts accepted.

CABOT CERTIFIED
CARBON BLACK
"Spheron"
Godfrey L. Cabot, Inc.
77 Franklin St. Boston, Mass.

CARBON BLACK—*Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Union Bank Bldg., Pittsburgh, Pa.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CARBON BLACK
DISPERSO . . . *the specially developed Carbon Black that gives* BETTER DISPERSION.
WISHNICK-TUMPEER, INC.
295 Madison Ave., New York

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street, New York City

CHEMICALS
Carbon Black—Clay
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

CHEMICALS

For Rubber	For Industry Generally	
Accelerators	*Acids*	*Latex*
Antioxidants	*Oil of Myrbane*	*Lotol*
Specialties	*Aniline Oil*	*Dispersions*

NAUGATUCK CHEMICAL
Div. of U. S. Rubber Products, Inc.
1790 BROADWAY NEW YORK

CHEMICALS and Mineral
Ingredients—Whiting, Clay, Talc, Barytes, Colors, Heavy Calcined Magnesia, Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
HEVEATEX CORPORATION
78 Goodyear Ave., Melrose, Mass.
Offices in New York, Akron, Chicago

COLORS—*for Rubber*
Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
Ansbacher-Siegle Corporation
Rosenbank, Staten Island, N. Y.
820 So. Clinton St., Chicago, Ill.
Agents in Principal Cities

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
MONSANTO CHEMICAL CO.
Rubber Service Laboratories Div.
1012 Second National Building
Akron, Ohio

THE MARKET PLACE Section Continued on Next Page